COMPARISON OF THE WATER ALLOCATION PROCESS IN ALBERTA TO OTHER JURISDICTIONS

Prepared for:

ALBERTA ENVIRONMENT
Edmonton, Alberta

March 2008

EE27048

EXECUTIVE SUMMARY

Purpose

In January 2007, the Alberta Water Council announced that it would review Alberta's water management policy governing criteria for transferring water between rivers in the same major river basin. While the current policy permits the movement of water from one part of a basin to another, significant public concern about one proposed intra-basin transfer suggested that a review of this policy was necessary to determine whether such practices are in the public interest. Specifically, the Alberta Water Council was asked:

> *"to determine if the current approach to making decisions about the movement of water from one sub-basin for use in another sub-basin within the same major river basin is still valid and what, if any, changes should be made to the current approach and under what conditions."*

Accordingly, the Alberta Water Council established the Intra-Basin Water Movement Project Team (IBWM) to report on this issue. To assist in their deliberations, the Team commissioned AMEC Earth & Environmental (AMEC) to conduct a review of current water management practices in selected provinces and states, specifically regarding inter- and intra-basin transfers of water. This assessment focuses only on surface water.

Scope and Methodology

This study examines water management systems and legislation in five Canadian provinces (British Columbia, Alberta, Saskatchewan, Manitoba, and Ontario) and nine of the United States (Arizona, California, Colorado, Montana, North Carolina North Dakota, Tennessee, Wyoming, and Utah). The first step involved conducting a review of legislation and literature for each jurisdiction to determine the general water rights framework they use, their approach to determining water availability for use, the types and nature of water rights, the process of administering these rights, and their approach to transfers among major basins (inter-basin) and within major basins (intra-basin). The second step involved interviewing one or more representatives of water management agencies in each jurisdiction to confirm the interpretation of the legislation was correct and to gain any insights into water management practices that were not evident from the literature review. A summary of water management legislation and provisions related to water transfers between and within basins is provided in Table A.

Overview of Water Rights Framework

Three types of water rights framework have evolved in North America: riparian, prior appropriation, and prior allocation. These systems, and variants on them, have evolved to reflect the unique combination of land and water use practices and development histories in Canada and the US.

Riparian System - A riparian owner or occupier is a person whose land abuts the shore of a natural water course or water body and, under common law, they can take water for domestic and other purposes as long as their water use does not impair the rights of other riparian owners. Shortages are expected to be shared among all users. Riparian systems are typically

employed in the eastern part of North America and are used in Ontario, Tennessee and North Carolina.

Prior Appropriation - The prior appropriation system evolved in the western United States so that people could divert water for use on land that does not abut a water course. Water users could "appropriate" water for any beneficial use recognized by law and, in times of shortage, priority was based on first in time, first in right where users with earlier recorded water use have seniority over more recent users. Appropriation rights are considered to be property rights and continue to exist as long as water continues to be used for beneficial purposes.

Prior Allocation - A prior allocation system is a government–controlled system where water rights are issued to individual users for specific volumes and purposes. Western Canadian provinces generally employ prior allocation systems where priority among users is also based on first in time, first in right, with seniority based on the date of application.

Most western provinces (except for British Columbia) and some western states (California and North Dakota) have hybrid systems that include limited recognition of riparian rights, particularly related to domestic use. All three systems have developed administrative tools, such as licences or permits, which allow them to keep track of how much water is being used.

Historically the key distinction between a prior appropriation system and a prior allocation system is that the former was based on the idea of an appropriator putting water to beneficial use whereas the latter has always involved an application to a government body for a licence or equivalent. Currently all prior appropriation states contemplate an application to the relevant government body before putting water to use.

Water Availability for Consumptive Use

Riparian systems allow water to be taken as long as the rights of other riparian (typically downstream) users are not affected. As riparian users are only allowed to take water in a manner that does not adversely affect other users, riparian systems offer some protection to instream flows. Further protection may be achieved by placing appropriate terms and conditions in permits. Under the prior appropriation systems, any water that was not already appropriated could be used for beneficial purposes, which are defined in law. Over time, instream flow needs have been recognized as a beneficial use in all western states assessed in this study except North Dakota, and water can be appropriated for instream purposes. Under the prior allocation system, the government can reserve water for instream purposes and can include terms and conditions in licences to ensure that instream needs are met. Some jurisdictions can also issue specific licences for instream purposes. In Alberta regulations to the *Water Act* set out the purposes for issuing a licence, including instream uses, but no privately-held instream licences have been issued under the *Act*. In many jurisdictions a stumbling block to recognition of private instream licences is a requirement that water rights be diversion rights. Some jurisdictions have overcome this limitation through creative interpretations of "diversion".

Right to Take and Use Water

In all jurisdictions, the province or states claim title to or ownership of all water. There are no formal rights to water under a riparian system. Riparian landowners have the ability to take and use water in a manner that does not affect other users. Riparian rights cannot be cancelled,

severed from the land, or transferred. Ontario uses a permit system to keep track of water use while North Carolina and Tennessee use a registration system, although North Carolina uses a permit system in designated "capacity use" areas. Water rights acquired under a prior appropriation system are considered to be property rights and cannot be taken away without due process and potentially the payment of compensation. In all cases, appropriative rights can be forfeited for non use, severed from the land, and may be transferred to other uses. Over time, most states, with Colorado being the exception, require water users to obtain a permit or licence to appropriate water. Prior allocations provide licensees with the right to divert and use water. Except in Alberta, licences issued under a prior allocation system cannot be severed from the land and cannot be transferred. In most, if not all, prior allocation jurisdictions, licences may be cancelled for non-use although the process of cancellation is easier in some jurisdictions than in others.

Process of Acquiring Rights to Take and Use Water

All the jurisdictions examined use a combination of permits, registrations and/or licences to keep track of water takings, appropriations and allocations. These instruments typically identify the water source, the diversion point, the purpose of use, the maximum rate of withdrawal, and the maximum volume that can be withdrawn. The process of obtaining the required permits or licences is fairly similar among all the provinces and states examined in this study. Typically, this involves submitting an application and a fee to a regulatory body which considers existing obligations to other users and may consider environmental factors and public concerns prior to making a decision. All jurisdictions provide an appeal mechanism, although the provinces use appeal boards while the western states rely more on the courts.

Administration and Enforcement

Nearly all of the states and provinces have similar approaches to enforcement. These typically involve issuing orders to cease or change activities and levying fines and penalties. A big difference is that, in the western states, non use of an appropriated right for more than five years typically results in forfeiture of the right with no compensation. Another difference is that there may be third party enforcement of appropriation rights, since they are property rights. Requirements for water use reporting and annual water use fees vary by jurisdiction.

Definition of Major Basins and Sub-basins

Although most states and provinces straddle continental basin boundaries, each jurisdiction has developed definitions of major river basins, watersheds, or hydrologic units, usually as subdivisions of the continental basins, and manages water at this scale. These "major" basins can be very large (Colorado and Montana each recognize only four basins at this scale) or very small (North Carolina recognizes 18 such basins). Basin boundaries are not usually defined in legislation unless there are some specific provisions in the legislation that need to differentiate one major basin from another. For example, states without prohibitions on inter-basin transfers do not include basin definitions in legislation. In riparian states, legislation is required to allow transfers of water between basins, in order to override the riparian principle, so definitions of basins must be included in the legislation. The five provinces included in this assessment have definitions of major basins in their legislation, primarily because they have specifically chosen to

prohibit transfers between major basins. Only two of the jurisdictions have definitions of sub-basins.

Transfers Between Continental and Major Basins

There are fundamental differences among systems regarding water transfers between continental and major basins. Under riparian systems, transfers among major watersheds or basins are naturally prohibited because of the nature of the riparian right, which allows persons to withdraw water in a manner that does not damage other riparian users without their consent. Thus, inter-basin transfers are only possible by way of a statute that allows a transfer. Both Tennessee and North Carolina have statutes that allow transfers and define the mechanism and process by which transfers between continental basins and between major basins can occur. Ontario prohibits transfers between continental basins. As a signatory to the Great Lakes – St. Lawrence Basin Sustainable Water Resources Agreement, Ontario has also prohibited transfers between the four major watersheds in the Great Lakes- St. Lawrence Basin. Other states and provinces that are signatories to this Agreement have imposed similar restrictions

As the prior appropriation system originated to detach water rights from land rights, there has been to date no prohibition on transferring water from one continental or major basin to another and, in fact, numerous inter-basin projects have been developed. Some states have actually developed legislation to limit transfers out of donor basins, especially between states. With no prohibition on inter-basin transfers, there is no need to define basins in legislation.

For prior allocation systems, until recently there has been no clear legislative direction as to whether transfers between continental or major basins are allowed or prohibited. Historically a number of projects that transferred water from one basin to another have been approved. For example, British Columbia has allowed a number of large inter-basin transfers for hydroelectric projects while Alberta approved a number of transfers of water between the Oldman, Bow, and Red Deer sub-basins for irrigation purposes. However, in the last 10 years, all of the western provinces have introduced legislation that prohibits transfers between continental basins and between major basins, although some exceptions are allowed. Alberta allows transfers between major basins only if approved by a special act of the legislature. Small inter-basin transfers are allowed in British Columbia. Saskatchewan allows transfers of water between basins for use inside Saskatchewan. Manitoba allows inter-basin transfers that are in the public interest. However, only British Columbia and Alberta have defined major basins in their legislation.

In those jurisdictions where inter-basin transfers are allowed, approvals must be obtained and the process is essentially the same as for obtaining any other licence or permit: an application must be submitted, there is public notification, and the application is evaluated in terms of potential effects on other water uses.

Intra-basin Transfer

The US states that use prior appropriation allow water transfers within basins as well as between basins. Intra-basin transfers require permits and approvals, and there is no need to include definitions of basins or sub-basins in legislation. In Tennessee and North Carolina, which use riparian systems, statutes have been developed to allow transfers within basins; North Carolina legislation includes definitions of sub-basins.

In Canada, only Manitoba specifically prohibits transfers between sub-basins. While the Manitoba legislation expressly prohibits transfers between sub-basins, this cannot be enforced because sub-basins have not yet been defined. British Columbia, Alberta, and Saskatchewan do not prohibit intra-basin transfers so theoretically such transfers are possible as long as the appropriate water licences are acquired.

Table A: Summary of Water Management Legislation

Province/ State	Nature of Right	Instrument	Exemptions (expressed as annual volume)	Priority	Instream Protection
Riparian Systems					
Ontario	Can take water for use as long as rights of other users are not impaired (common law right)	Permit	domestic and small agriculture<1380 dam^3	Shortages shared	Considered when issuing permits
North Carolina	Can take water for use as long as rights of other users are not impaired (common law right)	Registration	Agriculture <1380 dam^3 Other<138 dam^3	Shortages shared	Deny permits in capacity use areas
		Permits (capacity use areas)	Users<138 dam^3		
Tennessee	Can take water for use as long as rights of other users are not impaired (common law right)	Registration	Users <13.8 dam^3 Agriculture	Shortages shared	Managed for water quality
Prior Allocation					
Alberta	Right to Divert	Licence Registrations (agriculture)	Domestic <1.25 dam^3	FITFIR	Conditions in licences. Crown reservation Instream licences
British Columbia	Right to Divert	Licence	Short terms uses need approval	FITFIR	Conditions in licences. Crown reservation Instream licences
Saskatchewan	Right to Divert	Licence	New First Nation reserves	Equal	Only allocates 50% of natural flow
Manitoba	Right to Divert	Licence	Domestic (<9 dam^3)	FITFIR	Conditions in licences
Prior Appropriation					
Arizona	Appropriate for beneficial use	Permit	None	FITFIR	Appropriate for instream flows
California	Appropriate for beneficial use	Permit, converts to licence when project completed	Riparian use Pueblo rights	FITFIR	Appropriate for instream flows
Colorado	Appropriate for beneficial use	None. Affirmed by courts	None	FITFIR	Appropriate for instream flows
Montana	Appropriate for beneficial use	Permit	Use<8 dam^3	FITFIR	Appropriate for instream flows
North Dakota	Appropriate for beneficial use	Permit	Domestic and livestock use <10 dam^3	FITFIR	None
Utah	Appropriate for beneficial use	Water Right	None	Domestic, Agriculture, FITFIR	Transfers Review of applications
Wyoming	Appropriate for beneficial use	Permit converts to Certificate of Appropriation	None	FITFIR	Appropriate for instream flows

Table B: Summary of Water Management Provisions Related to Water Transfers Between and Within Basins

Province/ State	Continental Basins		Major Basins/Watersheds		Exceptions	Instrument	Sub-Basins	
	Number	Transfers Allowed	Number	Transfers Allowed			Number	Transfers Allowed
Riparian Systems								
Ontario	2	No	5 (Great Lakes)	Prohibited	Grandfathered projects	Permit	Not defined	Not prohibited
North Carolina	2	Allowed	18	Allowed		Small- registrations Large- approvals	38 sub-basins	Allowed
Tennessee	2	Allowed	10	Allowed		Registration (water) Permit to transfer	Not defined	Not prohibited
Prior Allocation								
Alberta	3	No	7	Prohibited	Special act of legislature	Water licence	Not defined	Not prohibited
British Columbia	2	No	9	Prohibited	Small volumes	Water licence	Not defined	Not prohibited
Saskatchewan	2	No	As yet undefined	Prohibited	Allowed within Saskatchewan	Water licence	As yet undefined	Not prohibited
Manitoba	1	No	As yet undefined	Prohibited	In the public interest	Water licence	As yet undefined	Prohibited
Prior Appropriation								
Arizona	2	Allowed	14	Allowed	Out of state	Permit	Not defined	Allowed
California	2	Allowed	10	Allowed	Out of state Wild Scenic River systems	Permit and Licence	Not defined	Allowed
Colorado	2	Allowed	4	Allowed	Out of state	Voluntary negotiated agreements	Not defined	Allowed
Montana	3	Allowed	4	Allowed	Department only > 4,000 acre-feet	Permit	85 sub-basins	Allowed
North Dakota	2	Allowed	13	Allowed		Permit	Not defined	Allowed
Utah	2	Allowed	11	Allowed		Approval of State Engineer	Not defined	Allowed
Wyoming	3	Allowed	13	Allowed		Permit Certificate of Appropriation	Not defined	Allowed

amec

TABLE OF CONTENTS

PAGE

EXECUTIVE SUMMARY I

1.0 INTRODUCTION 1
- 1.1 STUDY METHOD 1
- 1.2 REPORT STRUCTURE 4
- 1.3 WATER TRANSFERS 4

2.0 WATER RIGHTS FRAMEWORKS: AN HISTORICAL CONTEXT 5
- 2.1 RIPARIAN RIGHTS 5
- 2.2 ALBERTA'S PRIOR ALLOCATION AND HYBRID WATER RIGHTS SYSTEM ... 6
- 2.3 WESTERN U.S. STATE COMMON LAW PRIOR APPROPRIATION RIGHTS 7
- 2.4 PRIOR APPROPRIATION RIGHTS VERSUS ALBERTA STATUTORY RIGHTS 9
- 2.5 A NOTE ON GROUNDWATER 10

3.0 COMPARISON OF WATER MANAGEMENT FRAMEWORKS 11
- 3.1 ALBERTA 11
- 3.2 BRITISH COLUMBIA 13
- 3.3 SASKATCHEWAN 14
- 3.4 MANITOBA 15
- 3.5 ONTARIO 16
- 3.6 ARIZONA 18
- 3.7 CALIFORNIA 19
- 3.8 COLORADO 21
- 3.9 MONTANA 22
- 3.10 NORTH CAROLINA 23
- 3.11 NORTH DAKOTA 25
- 3.12 TENNESSEE 26
- 3.13 UTAH 27
- 3.14 WYOMING 28
- 3.15 SUMMARY 29

4.0 DRAINAGE BASINS AND WATER TRANSFERS: AN OVERVIEW 35
- 4.1 DRAINAGE BASINS 35
- 4.2 AN OVERVIEW OF WATER TRANSFERS AMONG BASINS IN CANADA 40

5.0 SUMMARY OF LEGISLATION RELATED TO WATER TRANSFERS 44
- 5.1 CANADA 44
- 5.2 ALBERTA 44
- 5.3 BRITISH COLUMBIA 46
- 5.4 SASKATCHEWAN 48
- 5.5 MANITOBA 49
- 5.6 ONTARIO 51
- 5.7 ARIZONA 54
- 5.8 CALIFORNIA 56

5.9 COLORADO 58
5.10 MONTANA 60
5.11 NORTH CAROLINA 62
5.12 NORTH DAKOTA 65
5.13 TENNESSEE 67
5.14 UTAH 69
5.15 WYOMING 71
5.16 SUMMARY 72
6.0 SUMMARY 77
6.1 WATER MANAGEMENT SYSTEMS 77
6.2 DEFINITION OF RIVER BASINS 78
6.3 INTER-BASIN TRANSFERS 79
6.4 INTRA-BASIN TRANSFERS 81
REFERENCES: GENERAL 82
LEGISLATION AND POLICY CONSULTED 84

LIST OF TABLES

Table 1: Summary of Water Allocations Systems by Jurisdiction 29
Table 2: Summary of Water Use Reporting and Annual Fees by Jurisdiction 32
Table 3: Major Drainage Areas in Each Province 36
Table 4: Classification System for Drainage Areas in the United States 38
Table 5: Number of Major Water Regions in Each State 39
Table 6: Inter-Basin Water Transfers by Province 40
Table 7: Major River Basins in Alberta 44
Table 8: Major Watersheds in British Columbia 46
Table 9: Major River Basins in Saskatchewan 48
Table 10: Major River Basins in Manitoba 49
Table 11: Major River Basins and Watersheds in Ontario 51
Table 12: Arizona Watersheds 54
Table 13: Major Watersheds in California 56
Table 14: Major River Basins in Colorado 58
Table 15: Major River Basins in Montana 61
Table 16: River Basins in North Carolina 63
Table 17: Major River Basins in North Dakota 65
Table 18: Watersheds in Tennessee 68
Table 19: Major Hydrologic Basins in Utah 69
Table 20: Major River Basins in Wyoming 72
Table 21: Summary of Legislation Related to Transfers between Continental Basins by Jurisdiction 73
Table 22: Summary of Legislation Related to Inter-Basin Transfers by Jurisdiction 74
Table 23: Summary of Legislation Related to Intra-Basin Transfers by Jurisdiction 76
Table 24: Key Characteristics of Water Rights Systems 77

LIST OF FIGURES

Figure 1: Provinces and States Included in the Assessment 2
Figure 2: Major Drainage Areas in Canada 37
Figure 3: Major Water Regions in the United States 38
Figure 4: Major River Basins in Alberta 45
Figure 5: Major Watersheds in British Columbia 47
Figure 6: Major River Basins in Saskatchewan 48
Figure 7: Major River Basins in Manitoba 50
Figure 8: Major River Basins in Ontario 52
Figure 9: Watersheds Within the Great Lakes – St. Lawrence Basin 53
Figure 10: Arizona Watersheds 55
Figure 11: Major Watersheds 57
Figure 12: Major River Basins in Colorado 59
Figure 13: Montana River Basins 61
Figure 14: River Basins in North Carolina 63
Figure 15: Major River Basins in North Dakota 65
Figure 16: Watersheds in Tennessee 67
Figure 17: Hydrologic Basins of Utah 70
Figure 18: Major River Basins in Wyoming 71

LIST OF APPENDICES

Appendix A Terms of Reference
Appendix B Province and State Summaries

1.0 INTRODUCTION

In January 2007, the Alberta Water Council announced that it would undertake a review of Alberta's water management policy governing criteria for the diversion of water from one sub-basin for use in another sub-basin within the same major river basin. While the current policy permits the movement of water from one sub-basin to another as long as water is available, the new withdrawal does not adversely affect other water users, and the applicant can obtain a water licence, a significant public concern about one proposed intra-basin transfer prompted a review of this policy to determine whether such practices were in the public interest. Specifically, the Alberta Water Council was asked:

> *"to determine if the current approach to making decisions about the movement of water from one sub-basin for use in another sub-basin within the same major river basin is still valid and what, if any, changes should be made to the current approach and under what conditions."*

Accordingly, the Alberta Water Council established the Intra-Basin Water Movement Project Team (IBWM) to report on this issue.

As part of developing its response, the IBWM determined that it would be useful to review the overall water resource allocation process in Alberta and to compare it to a number of other jurisdictions in Canada and the United States. Such a review is needed to help the IBWM Team understand the approach that these other jurisdictions take to water management in general, and specifically to water transfers between and within major river basins. The IBWM determined that a consultant should be retained to undertake this analysis and, in August 2007 issued the terms of reference for study to compare Alberta's water management framework to those of several other provinces and states. These terms of reference are provided in Appendix A.

In September 2007 AMEC Earth & Environmental was contracted to prepare this analysis and this report summarizes the results of these efforts. In preparing this report, AMEC recognizes the input of two leading researchers in Alberta water law - Professors Arlene Kwasniak and Nigel Bankes of the Faculty of Law at the University of Calgary – and their research assistants: Christine Smith and Rodney Smith.

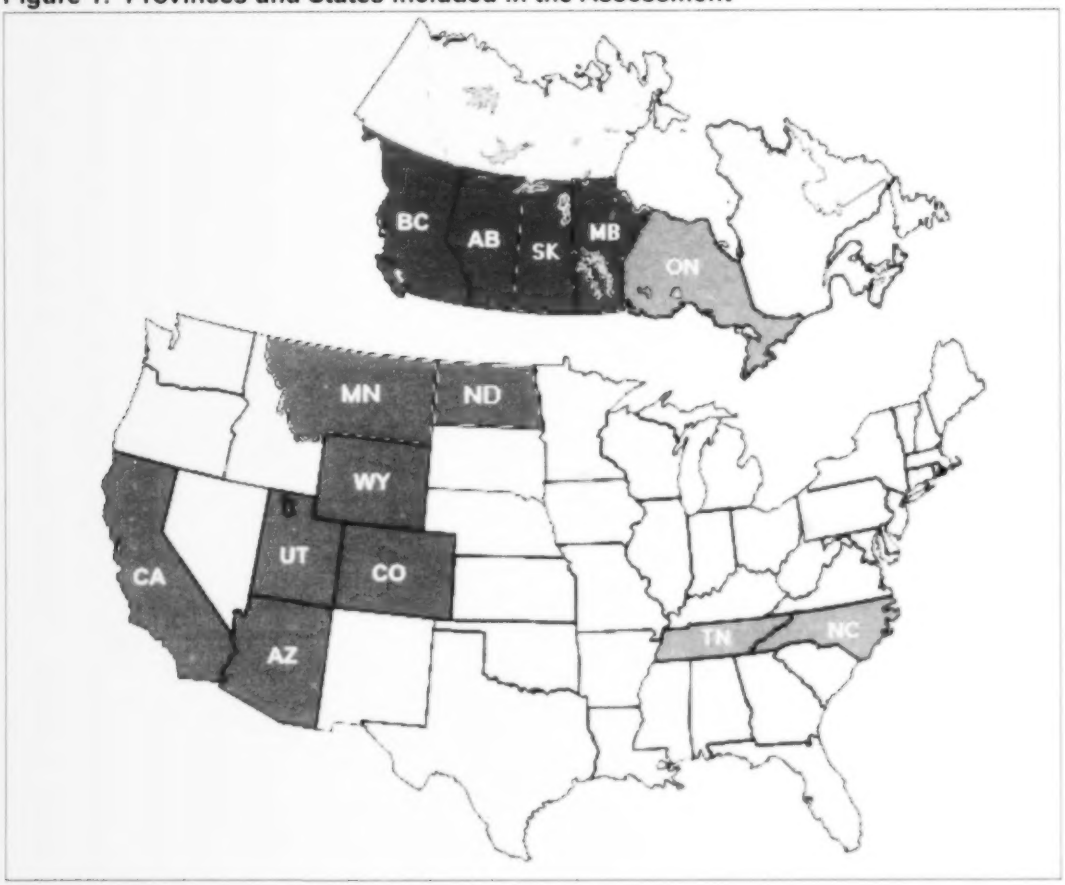
1.1 STUDY METHOD

This study is based largely on a review of legislation and other literature related to water management in five provinces and nine of the United States. The jurisdictions studied are as follows:

Canadian Provinces[1]:	United States	
British Columbia	California	Arizona
Alberta	Montana	North Dakota
Saskatchewan	Wyoming	North Carolina
Manitoba	Utah	Tennessee
Ontario	Colorado	

The location of these states and provinces is provided in Figure 1.

Figure 1: Provinces and States Included in the Assessment

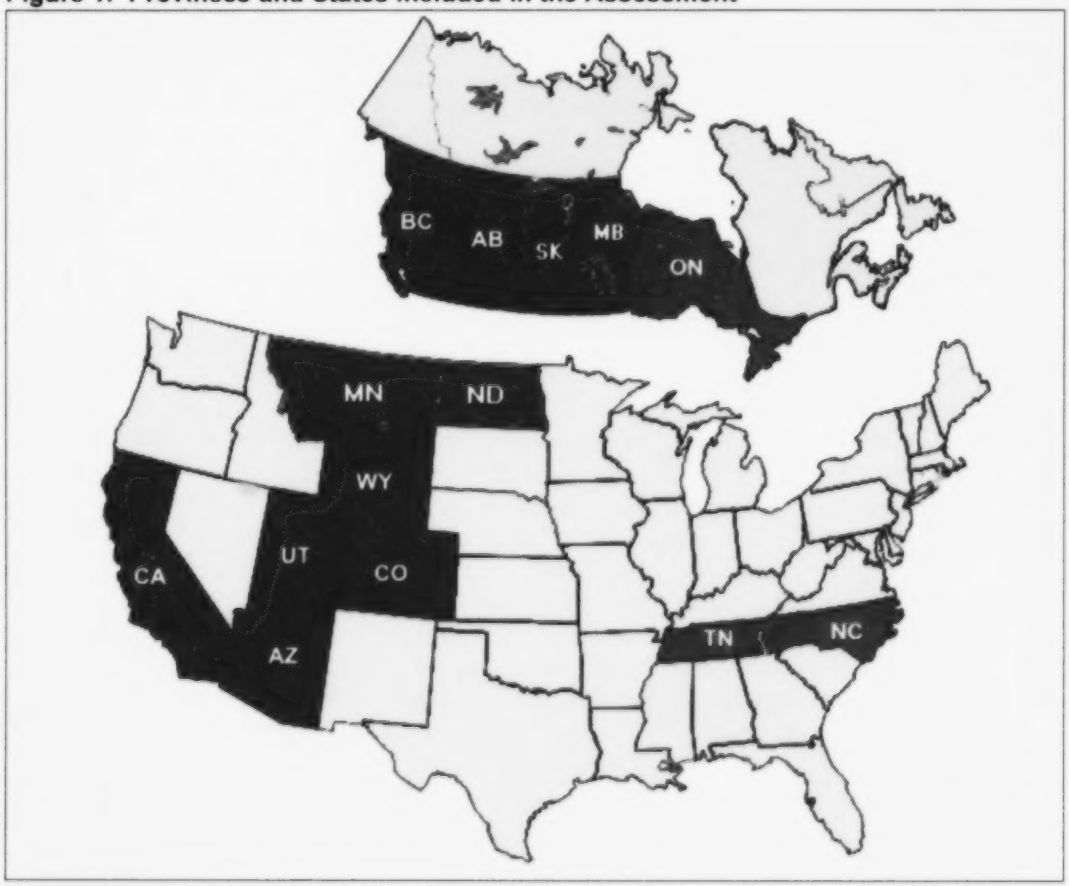


[1] The terms of reference included Quebec but not Manitoba, however, preliminary overview of the water rights system revealed that Quebec uses a system that would not be applicable to Alberta whereas some lessons could be learned from Manitoba's system. Thus, in discussion with Alberta Environment, Manitoba's water rights system instead of Quebec's system was reviewed.

Canadian Provinces[1]:	United States	
British Columbia	California	Arizona
Alberta	Montana	North Dakota
Saskatchewan	Wyoming	North Carolina
Manitoba	Utah	Tennessee
Ontario	Colorado	

The location of these states and provinces is provided in Figure 1.

Figure 1: Provinces and States Included in the Assessment



[1] The terms of reference included Quebec but not Manitoba, however, preliminary overview of the water rights system revealed that Quebec uses a system that would not be applicable to Alberta whereas some lessons could be learned from Manitoba's system. Thus, in discussion with Alberta Environment, Manitoba's water rights system instead of Quebec's system was reviewed.

The study team developed a template, consisting of key questions about the legislation and reflecting the study Terms of Reference (Appendix A), and used this template to characterize what and how the legislation is each jurisdiction can be characterized in terms of:

- the general legal framework employed (these are described in Section 2.0)
- the approach to determining how much water can be allocated
- the types and nature of water rights
- the process for administering and managing these rights
- the approach to transfers among major basins (inter-basin transfers)
- the approach to transfers within major basins (intra-basin transfers)

However, there can be subtle differences between what laws and regulations say and how these rules are put into practice. So, attempts were made to review completed templates with one or more representatives of the water management agencies in each jurisdiction to confirm that our interpretation of the legislation was correct and to gain any insights into water management practices that were not evident from the literature review. A list of the key people interviewed as part of this exercise is provided below:

Province/State	Name	Title
British Columbia	Glen Davidson	Director, Management & Standards Branch, BC Ministry of the Environment
Saskatchewan	Wayne Dybvig	Vice President, Operations Division, Saskatchewan Watershed Authority
Manitoba	Steve Topping Robert Matthews	Executive Director, Regulatory and Operational Services, Water Stewardship Manager, Water Licensing Branch, Water Stewardship
Ontario	Caroline Cosco	Senior Policy Analyst – Water Policy, Integrated Environmental Planning Division, Ontario Environment
Colorado	Dick Wolf	Director, Colorado Water Resources
Montana	Mark Phares Anne Yates	Attorney, Department of Natural Resources and Conservation, Legal Counsel Department of Natural Resources and Conservation
North Carolina	John Morris	Director, Water Resources Division, Department of Environment and Natural Resources
North Dakota	Dale Frink	North Dakota State Engineer
Tennessee	Paul Davis Robert Foster	Director, Water Pollution Control Director, Water Supply, Department of Environment and Conservation
Utah	Jared Manning	Utah Division of Water Rights
Wyoming	Harry LaBonde	Deputy State Engineer, State Engineer's Office

The resulting detailed summaries of the legislation and management systems in place in each jurisdiction are provided in Appendix B of this report. Although numerous attempts were made to contact representatives from Arizona and California, no comments were ever received so the

assessment for these states is based on our understanding of their water management legislation and policies.

1.2 REPORT STRUCTURE

The results of our investigations are presented in five sections. Section 2.0 provides an overview of the three main types of water management frameworks employed in Canada and the United States and describes some of the key features of each. Section 3.0 examines the overall regulatory structure and management approach used in Alberta, other provinces and states in terms of how each system determines how much water is available to be used, the types of water rights that each jurisdiction issues, the rights and responsibilities of water users, and some of the administrative procedures used. Section 4.0 examines any rules related to the transfer of water among major river basins or watersheds while Section 5.0 describes any results related to intra-basin transfers. Section 6.0 provides an overall summary.

1.3 WATER TRANSFERS

As the study progressed it became apparent that the term "transfer" could be used in two different ways:

- The physical movement of water from one location to another by way of a canal or pipeline; or
- An administrative change to a water allocation that permits all or part of the allocation to be diverted from a water body at a different location with or without a change of purpose.

This analysis relates only to the physical movement of water from one location to another, either between or within designated basins.

2.0 WATER RIGHTS FRAMEWORKS: AN HISTORICAL CONTEXT

Three types of water rights frameworks have evolved in North America. The riparian rights system was the original system used throughout the eastern portion of the continent. However, as settlers moved west, two other systems were employed: one based on prior appropriation and the other based on prior allocation. These systems, and variants on them, including some recognition of riparian interests, have evolved to reflect the unique combination of land and water use practices and development histories in Canada and the US. In order to understand the water rights system in Alberta, and effectively compare it to the frameworks used in other provinces and various US states, it is first necessary to identify and understand the fundamental differences among these various water rights frameworks.[2]

2.1 RIPARIAN RIGHTS

Following Canada's confederation in 1867, the Dominion of Canada sought to attract settlement westward, including to what is now Alberta. To do this, prospective settlers needed to be convinced that the land was suitable for farming. A key element was ability of the Dominion to demonstrate sufficient water supplies. Under the *North-west Territories Act* of 1870[3], the North-west Territories – what now roughly are Yukon, the Northwest Territories, Alberta, Manitoba and Saskatchewan – was to receive all English laws, including laws relating to water[4], except where such laws were deemed to be "inapplicable".[5][6] Included among English law was the common law of riparian rights

Riparian owners or occupiers hold riparian rights. A riparian owner or occupier is a person whose land abuts the shore of a natural watercourse, such as a river or a creek, or a natural body of water, such as a lake. [7] Although there are numerous common law riparian rights, the primary one is the right to use water.[8] Under common law, a riparian owner or occupier has the right to have the water continue to flow past the property in its natural state. For use for domestic purposes on the land itself, generally there is no limitation on how much a riparian could take. "Domestic purposes" meant household purposes such as water for drinking, cooking, fire control, and for watering domestic livestock. If a use was for what was called an "extraordinary" purpose, such as a commercial enterprise, the riparian use had to be

---

2 This introduction is primarily based on and adapted from three publications: A. Kwasniak, "The Supreme Court of Alberta and Water Law" forthcoming in The Supreme Court of Alberta Centenary Symposium (University of Alberta Press and the Osgoode Society for Canadian Legal History, 2007), A. Kwasniak, "Waste Not Want Not: A Comparative Analysis and Critique of Legal Rights to Use and Re-use Produced Water – Lessons for Alberta" Denver Water Law Review, Spring, 2007, and A. Kwasniak and A. Lucas, "Dribs and Drabs: Western U.S. and Canadian Responses to Water Scarcity" forthcoming in Proceedings of the 53rd Institute of the Rocky Mountain Mineral Law Foundation.

3 (Can.) 49 Victoria c. 25, § 3 (elec. 2007).

4 *See* J.E. Cote, "The Introduction of English Law into Alberta," 3 *Alta L. Rev.* 262, 263 (1964).

5 (Can.) 49 Victoria c. 25, s. 3. See also J.E. Cote, "The Introduction of English Law into Alberta", *Alberta Law Review*, 3 (1964): 262-291, 263.

6 (Can.) 49 Victoria c. 25, s. 3. See also J.E. Cote, "The Introduction of English Law into Alberta", *Alberta Law Review*, 3 (1964): 262-291, 263. Later this article explores how Courts developed tests to determine inapplicability with respect to some aspects of common law that were not replaced by legislation.

7 For a detailed discussion of common law water rights and legislative alteration throughout Canada , see David Percy, *The Framework of Water Rights Legislation in Canada*, (Calgary, The Canadian Institute of Resources Law, 1988).

8 Other riparian rights are the right to water quality, accretion, access, and to prevent flooding.

reasonable, and water had to be returned to the watercourse substantially unaltered in quantity and quality.[9]

2.2 ALBERTA'S PRIOR ALLOCATION AND HYBRID WATER RIGHTS SYSTEM

The Dominion realized early on that water use rights based on riparian ownership or occupancy would not be appropriate for settlers of the arid prairies. In seeking a solution, parliament looked to jurisdictions that had to some degree ousted riparian rights to facilitate agriculture and industry in the face of aridity. It looked to Victoria, Australia, where their legislature passed the Irrigation Act (1886) which claimed Crown ownership of surface water and initiated a government controlled water rights system.[10] It also looked to the western U.S. states where prior appropriation water rights developed at common law (see Section 2.3). Parliament settled on a legislative solution with the *North-west Irrigation Act* of 1894.[11] The *Act* introduced a water rights system similar to U.S. prior appropriation in that is was based on the principle of 'first in time, first in right' ("FITFIR"). Under the *Act*, priority to water was based on date of completed application for water to the public authority. In times of shortage, junior licensees – those with a later dated priority – had no right to water until all more senior rights were satisfied. The original *Act* attempted to eradicate common law riparian rights by requiring all current water users, including riparian users, to apply for a licence to validate their uses within one year of enactment.[12] This requirement did not go over well with those with riparian rights for domestic use, and it had a short life as a result. In 1895 the *Act* was amended to exempt domestic surface water users from the licensing requirement.[13] Accordingly, the *Act* abolished riparian rights in respect of extraordinary use, but allowed riparian rights to domestic use, and other riparian rights[14] to continue.

Notwithstanding the confederation of the Prairie Provinces (Manitoba in 1870, Alberta and Saskatchewan in 1905) the Dominion retained ownership and legislative authority over water, along with other natural resources and public lands. In 1930 the federal government transferred public lands and natural resources to these provinces pursuant to transfer of natural resources agreements.[15] Accordingly, federal legislation and the common law that survived it governed water rights in the prairies until the transfer. Following the transfer, each of the Prairie Provinces developed its own water rights legislation, based on the federal Act. In 1931 the Alberta Legislature passed the *Water Resources Act*.[16] Although amended many times, this *Act* remained law in Alberta until January 1, 1999 when the *Water Act* came into effect and

---

9 See, for example, Miner v. Gilmour (1858), *12 Moore's Privy Council Cases*, P.C.

10 Crown ownership is claimed in § 4 (elec. 2007). See Edwyna Harris, *An examination of water rights transition in colonial Victoria, Australia 1840-1886*, INTERNATIONAL SOCIETY FOR NEW INSTITUTIONAL ECONOMICS (2006), *available at* http://www.isnie.org/ISNIE06/Papers06/03.4/harris.pdf (last accessed June 18, 2007).

11 57-58 Victoria, 1894, c. 30 (elec. 2007).

12 *Ibid.*, § 7 (elec. 2007).

13 An Act to Amend the North-west Irrigation Act, 1895, 58-59 Victoria, c. 33, § 3 repealing and replacing § 7 (elec. 2007).

14 Other riparian rights are the right to water quality, accretion, access, and to prevent flooding.

15 The agreements are attached as Schedules 1, 2, and 3 to the *Constitution Act*, 1930, Appendix II [formerly *British North America Act* (1930), 20-21- George V, c. 26 (U.K.)] (elec. 2007). For an examination of the *Natural Resources Transfer Act* and its role in Albertan history, see Thomas Flanagan and Mark Milke, "Alberta's Real Constitution: The Natural Resources Transfer Act," in *Forging Alberta's Constitutional Framework* 165 (Richard Connors and John M. Law eds., 2005).

16 R.S.A. 1931, c. 71 (elec. 2007)

repealed and replaced its predecessor.[17] The *Water Act* retains the core principles of both predecessor Acts, notably the FITFIR principle. It also expressly confirms the continuance of any common law riparian rights, other than the right to the continued flow.[18] Hence, Alberta is a hybrid jurisdiction in that it recognizes both rights based on FITFIR and some rights based on riparian ownership or occupancy.

2.3 WESTERN U.S. STATE COMMON LAW PRIOR APPROPRIATION RIGHTS

As mentioned above, appropriation water rights in the western U.S. developed under common law. This system originally arose because water rights based on riparian ownership did not facilitate mining on federal public lands, where there was not a riparian water source. Common law "pure" appropriation rights were much like staking a mining claim. An appropriator went to a stream, diverted water by using some kind of structure, dug a ditch, and installed a device to regulate flow from the stream to the ditch.[19] The ditch carried the water to where it would be put to use.[20] The common law of prior appropriation became established through courts recognizing and upholding them as a species of property right[21] that vested by the appropriator applying the water taken from a natural stream to a beneficial use, without waste, and with due diligence.[22] In time, prior appropriation states recognized a variety of uses as beneficial uses including household uses, agricultural uses, municipal uses, and industrial uses as beneficial uses. Many states now recognize, either statutorily or through case law, recreational, or instream uses[23] as beneficial uses.

As property rights, U.S. appropriation rights are constitutionally protected through the Fifth and Fourteenth amendments to the American *Bill of Rights*.[24] This means that government cannot expropriate or engage in a regulatory "taking" of a right without due process and compensation for loss of value.

Early on there was little or no government involvement in the acquisition of an appropriation right. An appropriation could be made by constructing and operating a diversion works and there was no requirement to register these activities. If another appropriator questioned a right, a lawsuit might ensue and courts would adjudicate priority among appropriation claims. Courts enforce appropriation rights as against other appropriators in accordance with the FITFIR principle such that earlier appropriation rights have greater right (priority) to water put to a beneficial use than later appropriation rights. Such adjudication was possible because appropriation rights are property rights enforceable against the world. As property rights they

---

17 R.S.A. 1996, c.W-3.5 (elec. 2007).

18 *Ibid.*,§. 22(3).

19 Joseph L. Sax et al., *Legal Controls of Water Resources: Cases and Materials* 131 (4th ed. 2006).

20 *Ibid.*

21 *Ibid.* at 152.

22 *Ibid.* at 125.

23 For a summary regarding states recognizing instream uses as beneficial uses see Tom Annear et al, *Instream Flows for Riverine Resource Stewardship* 74-75 (rev. ed. 2002).

24 The Fifth Amendment reads: No person shall be ... deprived of life, liberty or property without due process of law; nor shall private property be taken for public use, without just compensation. The Fourteenth Amendment states that "No state shall make or enforce any law which shall abridge the privileges or immunities of the citizens of the United States; nor shall any State deprive any person of life, liberty or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of its laws."

also are susceptible to attack by junior appropriators who might be interested in claiming forfeiture or abandonment of senior rights, thus bettering their own position.[25]

Another feature of the prior appropriation system is that appropriation water rights continue to exist as long as the water is beneficially used. This means that water rights may be forfeited if not used for a specific period of time established by statute, without compensation, and the water can then be appropriated by another user.[26]

Some appropriation states early on developed permit systems, but they, it is said, were essentially "recording devices."[27] In other words, a right did not arise because of the issuance of a permit. The right arose and was perfected at common law, and the permitting system served to record those entitlements. Eventually all appropriation states, save Colorado, developed permit systems. However, there is a question regarding how much discretion a public authority may exercise in carrying out a permitting function, if there is available water, and if the common law rules for appropriation are met. This is especially so in states where the right to appropriate is recognized by state constitutions.[28]

There are nine appropriation states: Alaska, Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. California, Oklahoma, Nebraska, Kansas, North Dakota, Oregon, South Dakota, Texas, and Washington have hybrid water rights systems in that each state to a degree recognizes both prior appropriation and riparian water rights.[29] Over time, most of these states have implemented an administrative system whereby a new water right can only be obtained by way of government issued licence or permit. Consequently, recently issued rights in the so called prior appropriation states have begun to more closely resemble what is termed (in relation to Alberta, for example), an allocation system.

It should be noted that, within the U.S., there are also other types of water rights that affect how water is allocated and managed. There are federal reserved rights, which recognize that water rights were reserved (explicitly or implicitly) at the same time that land was reserved for federal purposes such as Indian reservations, national parks or national forests, where the water is critical for the purpose for which the land was reserved (Marble, no date). The priority of these reserve rights is based on the date of the reservation. The Federal Government exercises these reserve rights to ensure that there are sufficient flows for fish, wildlife and recreation through nationally protected lands. Such rights are often recognized and delimited under state law by way of compacts between the state and federal governments.

There is also what is termed "reclamation water rights". These are the rights owned by people who draw their water from a project funded by the US Bureau of Reclamation. In such cases, it

---

25 Sax et al., *supra* note 41, at 138.

26 Reisner, Marc and S. Bates, 1990. Overtapped Oasis: Reform or Revolution of Western Water. Island Press, Washington, D.C.

27 Sax et al., *supra* note 41 at 132.

28 *Ibid.* at 139. The strongest statement is found in Colorado's constitution, Article XVI, § 6 provides that the "right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied." (Referred to in *Ibid.* at 139).

29 *Ibid.* at 138.

is the Bureau that holds an appropriative water right from the state and the priority of the appropriation is based on FITFIR. However, all people holding reclamation rights in a reclamation district essentially have a water delivery contract with the Bureau (or a designated delivery entity to which the appropriative rights may have been assigned) and, in the case of shortages, available water is shared equally among all users within the district.

2.4 PRIOR APPROPRIATION RIGHTS VERSUS ALBERTA STATUTORY RIGHTS

FITFIR water rights in Alberta are statutory rights.[30] The Alberta government *allocates* water to users pursuant to statutory authority in contrast to users in western U.S. states *appropriating* water in accordance with common law and legislation. Hence statutory FITFIR rights in Alberta are licenced prior allocation rights, in contrast to western U.S. prior appropriation rights.

Whether an Alberta statute that creates a water right confers a property right has not been settled by law, though legal scholars have suggested that they do not.[31] In any case, under legislation, water rights are enforceable only against the government, or in accordance with legislation, and not against the world, as are property rights. So, if a junior licensee wishes to challenge a senior right, the junior must rely on the government to pursue the matter. If the government chooses not to pursue, for example, a forfeiture allegation, there is little or nothing that the junior can do.[32]

As well, property rights are not protected by the Canadian Constitution or Charter of Rights and Freedoms. So even if they were property rights, there is no constitutional guarantee of procedural or substantive due process if a level of government attempts to modify or extract them.

Finally, in contrast to U.S. prior appropriation states, "beneficial use" in Alberta is neither the *measure* nor the *limit* of a prior allocation right. In fact, although the notion played a historical role since allocation rights are partly modeled on appropriation rights, beneficial use plays no formal, legal, role in determining the nature of an Alberta water right. Legislation sets out the *measure* and *limits* of a prior allocation right. Under Alberta legislation, the water right is *the right to divert* and the measure and limits are the quantity of water, the rate and diversion point stated in a licence, the expressed purpose for the diversion, the stated conditions of use, and the applicable rights and limitations under prevailing legislation.

---

30 The first prior allocation statute that applied to what is now Alberta was the North-west Irrigation Act, 57-58 Victoria, 1894, c. 30 (elec. 2007).

31 *See, e.g.*, Alastair R. Lucas, *Security of Title in Canadian Water Rights* 31 (1990). This claim only is made of licensed water allocation rights and not of water rights generally. Riparian rights for domestic use have, in a limited manner, survived water resource legislation. Riparian rights are property rights.

32 The Water Act, R.S.A. 2000, c.W-3, § 55(1)(f) (elec. 2007) authorizes a director to cancel or suspend a licence for lack of use in limited circumstances]. There is no citizen enforcement provision in the Water Act. Although private prosecutions are possible under Canadian law, this process is available only where there clearly is an offence. *See* James Mallett, *Enforcing Environmental Law: A Guide to Private Prosecutions* (2005). Failing to exercise diversion rights is not an offence.

It should be noted that it has been common practice in Alberta to characterize its system of water rights as being "prior appropriation" mainly because it employs FITFIR for determining water use priorities among users. However, despite this one similarity, Alberta's system of allocating water through an administrative process that establishes the rights and responsibilities of each water user is fundamentally different from the prior appropriation systems employed in most western states, where water can be taken and used and disputes are solved through the courts. For many reasons, some of which will become evident through this paper, Alberta's prior allocation system addresses many of the problems associated with prior appropriation as do modern permit systems adopted in many states. Consequently, to prevent further confusion, this paper will purposely continue to describe Alberta's system of water rights as being "prior allocation".

2.5 A NOTE ON GROUNDWATER

The above analysis applies only to a limited degree to groundwater. Water rights frameworks in the western United States with respect to groundwater vary from state to state. Some states incorporate groundwater under prior appropriation, but some use other water rights frameworks, such as the rule of capture, the rule of reasonable use, or the rule of correlative rights. [33] In Alberta, groundwater rights were determined by common law until 1962. In 1962 they were brought under the *Water Resources Act*. From that time on, except for domestic use or other legislatively exempted uses, groundwater use requires a licence.[34]

To address the terms of reference for the study, the balance of this report focuses on surface water. However, transfers out of groundwater basins have become issues in other jurisdictions especially where groundwater is being used on non-overlying land ("trans-reservoir use of groundwater"). The International Joint Commission (IJC) considered transfers out of groundwater basins in its examination of the Great Lakes and recommended that:

> In reviewing proposals for removals of water from the Great Lakes to near-Basin communities, consideration should be given to the possible interrelationships between aquifers and ecosystems in the requesting communities and aquifers and ecosystems in the Great Lakes Basin

While a full assessment of the law and practice pertaining to transfers would require consideration of surface and groundwater and the interaction between them, this analysis focuses only on surface water management and transfers.

---

[33] Under the common law rule of capture a landowner may take percolating groundwater that did not flow in a defined channel without regard to impacts on others. This also is known as the "absolute dominion rule". The reasonable use rule limits groundwater use to uses that are reasonable, given uses on the overlying land. Under the correlative rights rule landowners have equal, correlative rights to the reasonable beneficial use of groundwater. See *Wellcare, Information about Who Owns the Water* (Water Systems Council) available online at <http://www.watersystemscouncil.org/VAlWebDocs/WSCDocs/1836033IN_WHO_OWNS.PDF>.

[34] *Water Resources Amendment Act*, S.A. 1962, c. 99, s. 2. For a pre *Water Act* discussion of groundwater rights in Alberta see David Percy, *The Regulation of Ground Water in Alberta*, (Environmental Law Centre: Edmonton, 1987).

3.0 COMPARISON OF WATER MANAGEMENT FRAMEWORKS

Canadian provinces and the US states employ a variety of different water management frameworks, with major differences between east and west. Generally, those provinces and states that drain into the Atlantic Ocean, and are perceived to have abundant water supplies, employ riparian-based systems for using water. Western provinces and states, where water is perceived to be scarce and must be rationed among competing uses, employ systems that are based on prior allocation (Canada) or prior appropriation (US), and may include limited recognition of riparian rights.

3.1 ALBERTA

3.1.1 Type of Water Rights System

Alberta has a hybrid system that recognizes riparian and groundwater rights subject to statutory quantity and use limitations but generally uses a prior allocation system based on first in time first in right. Household users can take up to 1,250 m^3 per year without requiring a formal allocation and are considered to have the highest priority. Users who diverted water for raising animals or applying pesticides to crops prior to January 1, 1999 (exempted agricultural users) are also allowed to use up to 6,250 m^3 per year without a formal allocation but have no priority. A user who registered the agricultural use prior to January 1, 2003, has priority as of first use (traditional agricultural user). All persons who wish to use water for any other purpose must first obtain an allocation. Allocations are issued in terms of licences that establish a maximum volume, with priority according to the date the completed licence application was received. These allocations also specify the water source, the purpose for which the water is to be used, the location of the use, and the maximum rate at which the water can be diverted. The Crown can also reserve unallocated water to determine how it should be used or for any other purpose.

3.1.2 Water Availability for Consumptive Use

All water is available for consumption other than where restricted by: the Apportionment Agreement with Saskatchewan Manitoba and Canada; in-stream flow allocations or reservations; conditions in licences to maintain minimum flow; or by moratoria on issuing additional licences. Specific factors that are considered in assessing licence applications include habitat and temperature requirements for fish, sustaining riparian vegetation and commitments to licensed and other water users. Requirements for instream flows and determination of the availability of water for consumptive use are being determined through the development of watershed plans. As part of the South Saskatchewan River Basin Water Management Plan, applications for new surface licences in the Bow, Oldman and South Saskatchewan sub-basins are no longer being accepted after August 2006 until the Minister of Environment specifies, through a Crown Reservation, how water not currently allocated is to be used. The *Bow, Oldman and South Saskatchewan River Basin Allocation Order* (Alta. Reg. 171/2007) sets out how reserved water in these sub-basins may be allocated. Where the aquatic environment is protected through an allocation issued for instream flow or water conservation purposes, the priority of this allocation will be junior to all previously issued consumptive licences.

3.1.3 Right to Take and Use Water

The riparian right to take and use water is associated with acquiring a property that borders a water course and allows the landowner or occupier to take water for household purposes without requiring a formal allocation.

In recognition of historical agricultural use of water, the *Water Act* allows water users who had diverted water prior to January 1, 1999 for raising animals or applying pesticides to continue to use up to 6,250 m^3 per year without a formal allocation but no priority. Farmers were also provided a three-year time period in which they could apply for a registration that would allow them to withdrawal up to 6,250 m^3 of water for agricultural purposes, with a priority date based on evidence of first use. New registrations are no longer being issued.

Unless there is a specific exemption in the regulations, all other users must apply for and obtain a licence. Licences and registrations have priority among themselves within each basin based on the priority date of their allocation. Licences specify the maximum amount of water that can be withdrawn, the rate, location and source of withdrawal, and the purpose for which the water is to be used. Most licences that were issued prior to the *Water Act* had no expiry date; licences issued since have expiry date and can be renewed. All or parts of water licences can be permanently or temporarily transferred from one user to another as long as there are no adverse effects on other licenced water users or the environment.

3.1.4 Process of Acquiring Rights to Take and Use Water

A Director must consider applications for water licences in the context of approved water management plans. Other factors that may be considered include any existing, potential or cumulative effects on the aquatic environment, hydrology, and on other users and, with respect to irrigation, suitability of the land for irrigated agriculture. The Director may also consider any other matter that is applicable in reviewing the licence application. Applicants must provide public notice, and persons who are directly affected by the application may file a statement of concern about the application. A Director must give notice of his or her decision to everyone who submitted a statement. In limited circumstances, a Director's decision on the issuance of water right can be appealed. A Director has limited power to amend a licence.

3.1.5 Administration and Enforcement

There is a small, one time, administrative fee that applicants pay with their applications. Requirements for reporting water use vary, with only larger municipal and industrial users being required to submit annual reports. This requirement however, is being expanded to cover other users as well. Water use is monitored through a complaints-based system and, in some cases, through the use flow measurements. Water rights can be enforced through suspension or cancellation of an allocation if there is a serious breach of terms and conditions or if the rights issued have not been exercised for at least three years and there is no possibility that those rights will be exercised.

3.2 BRITISH COLUMBIA

3.2.1 Type of Water Rights System

British Columbia employs a prior allocation system, with riparian rights having been extinguished shortly after the province received full control of its water resources from the Government of Canada in 1930. All persons who want to divert or use water for a long term (greater than 12 months) must obtain a licence where priority is based on the date on which, typically, the licence application was received. Short term users may obtain an approval. Water that has been allocated is termed "recorded". The legislation allows anyone (not just riparian land owners) to use unrecorded water for domestic purposes, mineral prospecting or firefighting without having to obtain a licence or approval.

3.2.2 Water Availability for Consumptive Use

In determining whether water is available for consumptive use, British Columbia must consider whether the water is "recorded" and may consider potential effects on fish and fish habitat. Licences may be issued subject to terms and conditions related to protecting fish and fish habitat. On watercourses that are determined to be "sensitive streams" applications may be refused or accepted subject to appropriate mitigation measures.

There a number of other ways in which British Columbia can protect the aquatic environment. It can reserve unallocated water under and Order–in-Council. Under the *Fish Protection Act,* it can issue a water licence for stream flow protection. In times of drought, temporary orders can be made to limit water withdrawals. And, allocations in existing licences can be reduced as party of a cabinet approved water management plan.

3.2.3 Right to Take and Use Water

In British Columbia, water users are defined according to purpose and duration of use. For long term use (greater than 12 months), water is allocated through licences while for short term approvals may be granted without licences. Persons who wish to remove water from British Columbia are also required to have a registration or a registered licence.

Licences are issued for one, two or three of nine purposes listed in the *Water Act,* and include a priority date and the location of the land or project to which the licence is appurtenant. Priority among licences is based on the priority date, although licences issued on the same day have priority according to purpose, with domestic use being the highest priority.

Priority is based on the date the licence was issued. Licences do not differentiate between what can be withdrawn and what can be used. Water users are required to provide records of water use and diversion and pay annual fee.

3.2.4 Process of Acquiring Rights to Take and Use Water

In reviewing applications for a water licence, a water manager may consider approved water management plan, in-stream flow requirements, potential impacts on existing users or earlier applicants, and concerns filed during a public notification process. A water manager's decision

on the issuance of water right can be appealed to the Environmental Appeal Board. A water manager has the power to amend a licence to authorize use of water for some purpose other than specified in the licence, to extend the term of licence, and to increase or reduce the quantity of water authorized. Licences may also be amended to reduce allocations for aquatic habitat as specified in water management plan, with no opportunities for appeal.

3.2.5 Administration and Enforcement

In British Columbia, a small fee is paid when submitting licence applications, and the fee is based on the volume and purpose. All licensees are required to pay an annual fee (rental fee) which also varies by purpose and volume of allocation. Licensees are required to keep records of diversion and water use and submit this information when requested. Water users may also be required to install, operate, and maintain equipment to monitor and provide flow data. Water rights can be enforced through suspension or cancellation of allocation if there is a serious breach of terms and conditions, if the rights issued have not been exercised.

3.3 SASKATCHEWAN

3.3.1 Type of Water Rights System

Saskatchewan and Alberta initially employed the same approach to water allocations, as both were governed by the *North-west Irrigation Act*. Saskatchewan now employs a hybrid system that recognizes rights arising from earlier federal or provincial legislation, recognizes riparian rights in relation to new reserves for Indian Bands, but requires all other users to acquire the right to divert by way of a licence. A major review of Saskatchewan's water legislation is scheduled to be undertaken in the next two years.

3.3.2 Water Availability for Consumptive Use

As a matter of policy, Saskatchewan limits total allocations to 50 percent of flows, thereby ensuring that at least half the flow remains in rivers and streams. Additional protection for instream protection is provided by terms and conditions in licences, such as minimum flow requirements.

3.3.3 Right to Take and Use Water

The *Saskatchewan Watershed Authority Act* allows persons owning land adjacent to a body of water to use any quantity of water for domestic purposes as long as they have obtained a licence to do so and their dugout or diversion works do not require an approval. This effectively limits domestic users to about 5 dam^3 of water per year.

All users require water licences which can be issued for domestic, wildlife, municipal, recreation, irrigation, industrial, multiple or other purposes. Licences are issued for any term that the Saskatchewan Watershed Authority considers appropriate, and may include any appropriate terms and conditions, including minimum flow requirements. Term water licences are issued to industries that require water for temporary processing operation. Licences issued since 1984 have no priority among themselves, but cannot be issued for water that has been allocated to another person. Although licences issued before 1984 could claim seniority in accordance with

prior allocation rules, this has not been done. In water short areas, shortages have been equally shared amongst licensees, rather than according to the FITFIR approach embodied in the original water management legislation.

3.3.4 Process of Acquiring Rights to Take and Use Water

All users must submit an application for a licence and pay a prescribed fee. Licence applications are evaluated in terms of scarcity of supply, impacts on adjacent users, purpose of use and quality of source water. There is no requirement for public notification for water licence applications. A licence may be denied if adverse effects are identified or the source of water is inappropriate. Construction of water structures may also be subject to further regulatory review and may require public notice. There is no right to appeal the issuance of water right; there is only a right to make submissions in the event of cancellation, amendment, or suspension.

3.3.5 Administration and Enforcement

Industrial water users pay an annual fee that varies depending on location and volume of water used. Fees are not required for agricultural or municipal users or for water where the concentration of Total Dissolved Solids exceeds 4000 milligrams per litre. With the exception o domestic users, all licensees are required to measure and report water use as a condition of their licence. Licences may be cancelled, suspended or amended for failure to comply with any term or condition in a licence or for a contravention of the legislation.

3.4 MANITOBA

3.4.1 Type of Water Rights System

The Manitoba system is also a hybrid system that recognizes riparian and groundwater rights for domestic purposes, but uses a prior allocation system for all others users. Domestic users are not required to obtain a licence, but all other water users must have a licence.

3.4.2 Water Availability for Consumptive Use

In evaluating a licence application, the Minister must consider scientific and other information on water body levels and instream flow to ensure that aquatic ecosystems are protected and maintained. The Minister may also undertake scientific investigations to determine whether aquatic ecosystems are being negatively affected by insufficient levels or flows. Watershed management plans are being developed to determine the balance between environmental requirements and licence commitments. Licences are not issued for instream purposes but terms and conditions to protect instream flows are included in licences issued for consumptive use.

3.4.3 Right to Take and Use Water

Domestic users can take up to 25,000 litres per day (9 dam^3 per year) for household and sanitary purposes and for watering lawns, gardens, livestock and poultry, without having to acquire a licence.

All other water users are required to obtain a licence, and priority based on the date of submission of the application. Licences are issued for specific purposes (agriculture, industrial,

and irrigation, municipal) and may be amended or revoked if not used for a one-year period. In the cases of licences issued on the same date, priority is based on purpose, with domestic and municipal purposes having the highest priority. Licences specify the annual withdrawal volume and rate, purpose, and diversion location. Most licences are issued for terms of up to 20 years.

3.4.4 Process of Acquiring Rights to Take and Use Water

Anyone who wants to use water must submit an application and pay a prescribed fee. The application is evaluated in terms of its effects on water body levels and in-stream flow needs. Although there may be public notification if there is sufficient reason, this has not occurred. The applicant or others may appeal a decision regarding a water licence to the Municipal Board, but there have been no such appeals in recent years.

A licence can be restricted or suspended if there is insufficient water to ensure that aquatic ecosystems are protected and maintained. The licence can also be amended to reduce the allocation if a licensee is not using its full allocation.

3.4.5 Administration and Enforcement

In Manitoba, there is a standard $50 licence application fee. Industrial water users are required to pay annual fees based on the volume of water use. All licences contain a clause requiring licensees to submit reports of their water use. Records may be required daily, weekly, or monthly. Licences can be cancelled or suspended for a breach of a condition in a licence. Any one who fails to comply with a provision of the legislation or a term or conditions of a licence may be subjects to fines or imprisonment.

3.5 ONTARIO

3.5.1 Type of Water Rights System

Unlike the western provinces, Ontario uses a riparian system. This means that water users do not have a defined right to water, as would be conferred by an allocation, but are able to take water for use. To manage its system, Ontario requires that all water users acquire a permit to take water (PTTW).

3.5.2 Water Availability for Consumptive Use

In determining whether water is available for use, Ontario is bound by international treaties, such as the *International Boundary Waters Treaty Act* and the Great Lakes Charter. It must assess potential effects on other permit holders; in areas that have been designated as "high use watersheds", no new permits are being issued.

Environmental requirements for water are also assessed as part of the process for issuing permits. Factors to be considered include: natural functioning of the ecosystem, natural variability of water levels, minimum stream flows, and habitat related to flow. This evaluation is done by referring licence applications to other agencies for comments and recommendations, including the local Conservation Authority or the Department of Fisheries and Oceans if a Conservation Authority does not exist.

3.5.3 Right to Take and Use Water

A PTTW is required where water users are taking more than 50,000 litres per day (18.25 dam^3 per year). Exceptions are for domestic purposes and watering livestock or poultry where less than 379,000 litres per day (1,383 dam^3 per year) is required, for firefighting, and for grandfathered wells, intakes and structures operating prior to March 30, 1961. The legislation does not assign priority among permitted users. Water shortage strategies are developed for individual watersheds by Conservation Authorities or other designated groups. These strategies assign with highest priority given to uses that are considered to be "essential", then to important uses, and finally to non-essential uses.

Terms and conditions in PTTWs are determined by regulatory agencies. All permit holders must comply with the terms and conditions on their permit. Permits can specify consumptive use and return flow requirements, including location and manner of return flow. Permits are issued for a fixed period of time.

3.5.4 Process of Acquiring Rights to Take and Use Water

In Ontario applications for permits are categorized into three groups according to volume and water source, with different information requirements for each:

Category 1	renewals, ponds smaller than 150 m^3 that collect run-off	No additional studies or work is required
Category 2	water from Great Lakes or connecting channels below a threshold (379,000 litres per day (138 dam^3 per year), takings from courses with previous assessments, takings or returns with no major change in quality or quantity, lakes and ponds with small takings (less than 1 million litres per day or 365 dam^3) *(List not complete)*	Scientific review by a qualified person and audits may be undertaken
Category 3	all others	New scientific studies must be prepared

Notice of applications for permits is given to the local Conservation Authority and municipalities in which the taking is to occur. Notification of other parties and Conservation Authorities may occur at the discretion of the Director. Notification is done by way of the Environmental Registry or other methods. The Director's decision is subject to three types of appeals - an appeal filed by the applicant, appeals filed by third parties for certain types of allocations, and appeal filed by the local watershed organization. A Director has the authority to amend or revoke a permit and alter terms and conditions of a permit after it has been issued.

3.5.5 Administration and Enforcement

In Ontario, a fee is paid when permits are renewed every two to 10 years. Currently there is no annual fee for water use. However, a proposal to charge volumetric fee for large commercial and industrial users on the actual water use has recently been proposed. All permit holders must install appropriate monitoring system to collect water taking data daily and must report this data annually. Permits can be amended or revoked. Provincial officers can issue orders that

specify the perceived contravention of the terms and conditions of a permit and provide direction as to how the problem should be addressed.

3.6 ARIZONA

3.6.1 Type of Water Rights System

In Arizona the main water source is groundwater which is regulated in accordance with the reasonable use doctrine. For surface water, Arizona uses a prior allocation system, but permits are needed to make an appropriation. The permit system was implemented in 1919. Water appropriations in Arizona are also affected by the states agreements with others states, including the Lake Mead Compact, the Colorado River Compact, and the Upper Colorado River Basin Compact.

3.6.2 Water Availability for Consumptive Use

Persons can seek a permit for any unappropriated water. The *Waters Act* recognizes that recreation and wildlife, including fish, are beneficial uses, and both the government and private persons can appropriate water for instream flows. Part of the mandate of the Arizona Water Protection Fund Commission is to acquire rights to enhance instream flows. Water held under an existing consumptive right may be transferred or leased to a private or public entity for instream purposes.

3.6.3 Right to Take and Use Water

A water right is established by appropriating water and putting it to beneficial use, without waste, and with due diligence. To administer surface water rights, a permit system was implemented in 1919. Once surface water has been put to beneficial use to the satisfaction of a director, the date of the application will be used to denote priority. Disputes over priority claims are adjudicated by the superior court. Water permits and rights are held for particular uses and a Certificate of Water Right will set out the flow rate, the nature of the beneficial use, the time and place of use, the source of the water, and the place and means of diversion.

There are also federal reserve water rights and these have a distinct status.

It is noteworthy that Arizona also recognizes effluent rights (grey water rights). Effluent is considered to be state-owned, but is not subject to appropriation or groundwater rules. The state has not regulated effluent but is allowing municipalities to decide whether they will sell treated wastewater.

3.6.4 Process of Acquiring Rights to Take and Use Water

To appropriate surface water, persons must file an application with the Arizona Department of Water Resources (ADWR) and pay a small administration fee. If approved, the permit provides a five-year period for any works to be completed and water put to beneficial use, and a Certificate of Water Rights will be issued if these conditions are met. Applications may be rejected if the proposed appropriation conflicts with vested rights, is a menace to public safety, or is against the interests and welfare of the public. The ADWR gives public notice of an application and there is an opportunity for public protest. An administrative hearing may be held

to determine whether a permit should be issued. A party to the decision may seek a judicial review.

Permits are only issued for the amount of water that can be put to beneficial use. Applications for municipal uses may be approved to the exclusion of all subsequent appropriations if the needs of the municipality so demand. A change of use of water appropriated for domestic, municipal or irrigation uses requires the approval of the director.

3.6.5 Administration and Enforcement

There are no annual charges for water use. Regulators monitor water use in terms of calls on the water delivered though state-owned water management infrastructures. For example, half of Arizona's allocation from the Colorado River is delivered via the Central Arizona Project which serves 56 municipal and industrial uses, 10 Aboriginal communities and 10 agricultural districts. Ceasing to use a water right for five years can result in forfeiture of the right.

3.7 CALIFORNIA

3.7.1 Type of Water Rights System

California uses a hybrid system that combines prior appropriation and riparian rights. Riparian rights result from ownership of land adjacent to a surface water source. Other water rights can be obtained by appropriating the water and putting it to beneficial use. California also recognizes "pueblo rights", which is derived from Spanish law and allows the residents of Spanish or Mexican pueblos to claim water rights for municipal use for all naturally occurring water from the watershed that flows by way of a stream through the original pueblo.

3.7.2 Water Availability for Consumptive Use

The California Constitution mandates that water in the State is to "be put to beneficial use to the fullest extent of which they are capable" without waste or unreasonable use and with a view to public welfare. The use of water for recreation and preservation and enhancement of fish and wildlife is considered to be a beneficial use of water. Applications for water rights are submitted to the State Water Board which must determine if water is available for appropriation, based on a review of the public interest regarding the amounts of water required for recreation, fish and wildlife. The Department of Game and Fish recommends the amounts of water necessary to preserve fish, wildlife and recreation, and the Board considers this information in setting our instream flow requirements in the new permit. Appropriations may also be issued for instream purposes and existing appropriations for other uses may be transferred for instream purposes.

3.7.3 Right to Take and Use Water

As noted above, California recognizes three types of water rights. Riparian rights are limited to the amount of water that can reasonably and beneficially be used on the riparian parcel. Permits are not required. Although riparian users have equal priority among themselves, they share shortages with other water users. Riparian rights cannot be transferred, do not apply to seasonal storage of water, and cannot be lost by non-use.

Appropriative rights are limited to the amount of water put to ongoing beneficial use, where priority is based on first in time, first in right. Thirteen types of beneficial users are recognized. Appropriative rights are severable from the land, and can be leased, exchanged or transferred with approval. Rights may be forfeited lost for non-use after five years or abandoned. Permits are issued for a specific purpose for diversion of a specified volume or amount being put to a beneficial use without waste from a specified point of diversions.

Pueblo rights are limited to ordinary municipal use by pueblos, may be paramount to all other rights in the watershed, may increase over time due to population growth, but are not transferable.

However, the Water Code states that a permit that allows municipalities to use water for domestic purposes shall be considered first in right, irrespective of whether it is first in time. The Code also notes that the second highest water use is for irrigation.

3.7.4 Process of Acquiring Rights to Take and Use Water

Riparian land owners are allowed to take water without requiring a permit. Pueblo rights are recognized as historical rights that can increase over time due to population increases; no permit is required. All other water users must obtain a permit and then a licence.

Prior to 1914, rights were acquired by prior appropriation, simply by posting the diversion and use information with the County recorder. Since 1914, water users have been required to submit applications for a water right/use permit. At present, applications and application fees are submitted to the State Water Board which must determine if unappropriated water is available, the relative benefits associated with the proposed beneficial use, and possible water pollution and water quality effects. Public notice is given to interested parties when an application is filed, and parties may file protests. The Board may conduct a field investigation or hearing. Once the permittee has completed the works and all terms and conditions are met, a licence is issued to confirm the right and it remains in effect as all terms and conditions are met and the water is put to beneficial use. Decisions by the Board are reviewable by the Superior Court.

Persons holding appropriative rights can apply to change the point of diversions, place or use or purpose of use, and are subject to review by the State Water Board. The proposed changes can be approved as long as other rights are not injured by the change.

3.7.5 Administration and Enforcement

The state does not levy any annual charges to people holding water rights, except water delivery charges through state-owned infrastructure. All water users are required to meter their use and report this information. The State Water Board may issue cease and desist orders to enforce water rights, with failure to comply resulting in the courts being asked to issue prohibitory or mandatory injections or restraining orders. Fines may be imposed for violations of a Board order.

3.8 COLORADO

3.8.1 Type of Water Rights System

Colorado employs a prior appropriation system. Although a water right arises when water is put to a beneficial use, without waste and with due diligence, priority is established after a water right has been adjudicated. With standard appropriation rights, priority usually relates back to the date of beneficial use, but may relate back to the date of the last adjudication. With conditional water rights, (i.e. water rights granted conditionally upon water being put to a beneficial use), once the water has been put to a beneficial use priority will relate back to the time when the right was granted. Storage water rights also may relate back to date of the granting of the right. As with other appropriation states, water rights are considered property rights. However, under the state constitution, when sufficient water is not available for all users, domestic purposes have preference over other users. The courts have interpreted this apparent priority as giving domestic users the right to expropriate and pay compensation for water rights during times of shortage.

3.8.2 Water Availability for Consumptive Use

Colorado legislation makes no allowance for denying an out-of-stream appropriation to retain water for environmental purposes. Under Colorado's constitution, "the right to divert the unappropriated waters of any natural stream to beneficial purposes shall never be denied" (emphasis added). Instream users are considered to be beneficial under common and legislation, but only the Colorado Water Conservation Board may appropriate water for instream purposes. In the past, water for instream purposes has been purchased from or donated by people or agencies that had been using the water for other purposes (Reisner and Bates, 1990). However, appropriations for instream purposes require adjudication in the water courts. In cases of emergencies, temporary loans for instream use do not require adjudication. In addition, municipal entities and water districts may apply for a recreational in-channel diversion which is, in effect an instream water right.

3.8.3 Right to Take and Use Water

Unlike other states that use a prior appropriation system, Colorado has not implemented a formal permit system for administering water rights. Users appropriate water and put it to a beneficial use, with due diligence and without waste. Two types of rights are recognized. Direct flow rights are recognized for users who divert water and put it to a beneficial use. These rights are defined in terms of a rate of flow. Users who store a volume of water for beneficial use in the future are recognized to have a storage right. When challenged, water rights are affirmed by water courts.

All users have equal rights to water although, as noted previously, priority is established as the date the water was first put to beneficial use. Rights are recognized for a specific purpose for diversions from a specific source at a specified location at a specified rate to a maximum volume. Persons who are developing a water use project and are not yet using water to beneficial purpose can be awarded a conditional water right that may be converted to an absolute water right once the works or project has been completed.

3.8.4 Process of Acquiring Rights to Take and Use Water

Except for storage rights, water rights are acquired by the act of appropriation and putting water to a beneficial use. This involves an open, physical demonstration of intent to take the same for such use. Physical diversion is not required for the appropriations for instream flow protection. Municipalities may also acquire water for future use and lease rights until they put the water to a beneficial use.

Appropriators may then get their rights determined by water judges who have exclusive jurisdiction over surface water rights determinations. There are nine water districts. An appropriator applies to a judge in the district of the diversion for a determination that an appropriation has been made in accordance with the law. There are opportunities for persons to file statements of opposition. If there is opposition a referee examines the application and all statements of opposition and makes a ruling. If a protest is made to a ruling the judge will hold a hearing. A water right confirmed by the court is called a "decreed water right."

An appropriator seeking a change of use must apply to a water court. Any change of use is subject to the "no harm" rule, including to junior appropriators since they are entitled to "the continuation of stream conditions as they existed at the time of their respective appropriations."

3.8.5 Administration and Enforcement

A law passed in 2003 required that certain water rights holders pay an annual fee. However, given its unpopularity, the law was repealed and fees paid were refunded without interest. The State Engineer's Office monitors water deliveries, obtains water use data, may order the installation of gauges or other measuring devices, and undertake investigations.

State administrative officials may initiate proceedings to extinguish a water right for intentional abandonment of right, or involuntary loss and forfeiture of a right. Rights may be partially abandoned or forfeited. Junior appropriators, as holders of a property right (which water rights are in Colorado) have a common law right to initiate abandonment or forfeiture proceedings where they might better their priority.

3.9 MONTANA

3.9.1 Type of Water Rights System

Montana follows a prior appropriation system, although since 1973 new rights can only be acquired via a permit. All water rights acquired prior to July 1, 1973 are slowly being reviewed and finalized through a state-wide adjudication process in state courts. Federal reserved water rights for Indian reservations and federal lands such as National Parks and Fish and Wildlife properties are provided for through Compacts. Priority is based upon the time that water was first appropriated for pre-1973 rights and on the time of receipt of a complete application for post-1973 permit rights.

3.9.2 Water Availability for Consumptive Use

Montana has closed some of its basins to certain types of new water appropriations due to concerns as to water availability, over-appropriation, and to protect existing water rights. Montana's instream flow program began in 1969 when the state enacted legislation allowing the

Department of Fish, Wildlife and Parks the right to appropriate water on 12 trout streams. This was extended in 1973 to allow any state or federal agency to request minimum flows on any stream and further extended in 1989 and 1995 to allow the Department (and ultimately individuals and private groups) to lease water rights for instream uses. The Department may also acquire instream rights by transfer from existing users.

3.9.3 Right to Take and Use Water

Any new appropriation requires an application for a beneficial water use permit. Prior appropriations rights and permits may be held for any beneficial use. Montana law recognizes a wide range of beneficial uses including agriculture, commercial, domestic, industrial, municipal, navigation, wildlife, fish and fish protection, power and pollution abatement. A permit is not required if a person proposes to develop a well or groundwater spring with an anticipated use of less than 35 gallons per minute and 10 acre-feet per year (12 dam^3).

3.9.4 Process of Acquiring Rights to Take and Use Water

Pre-1973 water rights were acquired by putting water to beneficial use. Post-1973 rights are acquired by permit. An application, once received, is reviewed by the Water Resources Division of the Montana Department of Natural Resources and Conservation (DNRC) for completeness. DNRC then publishes a notice of the application in a newspaper and contacts potentially affected water users. Objections that cannot be resolved will result in an administrative hearing. The application will be subject to screening to determine if it is necessary to prepare an environmental impact assessment.

3.9.5 Administration and Enforcement

The DNRC is responsible for the administration, control, and regulation of water appropriated after June 30, 1973. The Montana Water Court is responsible for general stream adjudications for all pre-1973 water rights. There is no annual fee for water rights. Post-1973 permits may impose requirements for reporting on water use. Disputes between water users will be resolved through the state district courts.

3.10 NORTH CAROLINA

3.10.1 Type of Water Rights System

North Carolina follows a riparian rights system that allows riparian landowners to use water in a stream for a reasonable purpose in a manner that does not adversely affect other riparian users without their consent. However, it employs an administration system to monitor water use. The water rights system that exists today in North Carolina is based on a mix of statutes and environmental policies that have helped guide water permitting. The evolution of this system is driven by several factors including the fact that water supply so far has never been a big concern for the state, the population is evenly dispersed, and large scale irrigated farming, which places large demands on water supply, is limited. The State Assembly however, has begun discussing the need to implement a state wide permitting system.

3.10.2 Water Availability for Consumptive Use

In those parts of North Carolina where water supplies are perceived to be sufficient to meet instream and consumptive needs, there are no restrictions on water use. However, the North Carolina Environmental Management Commission may designate "capacity use areas" where water use requires coordination and limited regulation to protect the rights of residents, property owners or the public interest. In these capacity use areas, applications for water use permits may be subject to an environmental assessment and applications that jeopardize water quality, aquatic habitat, or endangered species may be denied.

3.10.3 Right to Take and Use Water

Agricultural users who withdraw more than 1 million gallons per day (1,380 dam^3 per year) or other users withdrawing more than 100,000 gallons per day (138 dam^3 per year) are required to register with the state. Non-riparian landowners must obtain a registration. All registered water users have equal priority among themselves. Registrations must be renewed every five years.

A slightly different system is employed in areas that are defined to be "capacity use areas". In these areas all people who withdrawal in excess of 100,000 gallons per day (138 dam^3 per year) must obtain a permit. An environmental assessment process may be employed to assess applications for permits, and permits are issued subject to various terms and conditions. Priority for water use is given to uses that are the least consumptive (i.e. those having a large return flow component). Permits may be cancelled.

3.10.4 Process of Acquiring Rights to Take and Use Water

For most water uses, water users must register with the state. There is no formal public notification process for a registration although information on registrations is available on the department's website.

In capacity use areas, they must obtain a permit that requires evaluation by the Environmental Management Commission. Factors considered by the Commission ir ude whether the withdrawal will result in water depletion or dilution to the extent that it impacts existing or proposed uses or injures public health, safety, or welfare. Applications for permits require an environmental assessment, which requires public notification and participation.

3.10.5 Administration and Enforcement

In North Carolina, there is no annual fee for water use. Most water users are required to report monthly on quantities of water withdrawn, used and nature of use; agricultural users withdrawing less than 1 million gallons per day (1,380 dam^3 per year) are exempt. Water managers have the authority to require water users to install monitoring equipment to report water use. In capacity use areas, criminal and/or civil penalties can be applied to any users, depending on the nature of the violation. Disputes among riparian users are addressed in the courts.

3.11 NORTH DAKOTA

3.11.1 Type of Water Rights System

North Dakota is the only other US state included in this assessment (other than California) that, at least formally, recognizes pre-existing riparian rights as well as rights acquired by prior appropriation, prescription and by permit (post 1955). That said, the State Engineer, in an interview, discounted the significance of riparian rights. Federal reserved water rights for Indian reservations and federal lands such as National Parks and Fish and Wildlife properties are provided for through Compacts. Priority is based upon date of receipt of a complete application for permit-based rights. A key concern in North Dakota is that the Missouri River provides the main reliable source of water for the state and the state is therefore generally more supportive of basin transfers than other US states.

3.11.2 Water Availability for Consumptive Use

Generally all water is available for consumptive use. Instream flows are protected to a limited extent in the Little Missouri. The state does not issue permits for instream use and does not recognize instream use as a beneficial use. The state engineer may, and on the direction of the Commission must, reserve and set aside waters for beneficial use in the future. No person may hold a water permit for irrigation purposes that exceeds 720 acre-feet (888 dam^3). This provision does not apply to irrigation districts or to appropriations from the Missouri.

3.11.3 Right to Take and Use Water

All new appropriations of water require a water permit except for water appropriated for domestic and livestock purposes for less than 12.5 acre-feet (15 dam^3). Permits may be issued for any beneficial use.

3.11.4 Process of Acquiring Rights to Take and Use Water

An applicant must file an application for a conditional water permit and must provide broad notification of that application to, amongst others, each local city municipal and water use facility, each local owner of real estate, and other water permittees. The applicant must be able to demonstrate that the rights of a prior appropriator will not be unduly affected, that the proposed means of diversion adequate, and that the proposed appropriation in the public interest considering: (a) benefit to the applicant, (b) effect on economic activity, (c) effect on fish, game and recreational opportunities, (d) alternate uses, (e) harm to other persons, and (f) ability of applicant to complete the appropriation

The state engineer makes a "recommended decision" on any application. The applicant and any person aggrieved may request a hearing in relation to a recommended decision before it becomes a final decision. There is a right of appeal to the District Court if the state engineer rules that the application does not meet the prescribed criteria

3.11.5 Administration and Enforcement

The two principal bodies involved in administering the appropriation system are the State Engineer and the State Water Conservation Commission. There are no annual fees for the use of water. All permittees are required to install measuring devices and to report annual water use data. Enforcement tools available to the State Engineer include: inspections; forfeiture for

failing to put water to beneficial use; administrative orders; and applications to court to enforce orders and enjoin unlawful appropriations. Disputes between water users are resolved by state courts.

3.12 TENNESSEE

3.12.1 Type of Water Rights System

Tennessee follows a riparian rights system. With the exception of use by municipalities, non-riparian use of surface water is prohibited. The water rights system that exists today reflects a generally abundant water supply and pressures from neighbouring jurisdictions for access to this water. Tennessee has good availability of water, although there are some localized deficient areas. The state lies downstream of major impoundment structures constructed by the Tennessee Valley Authority and Army Corps of Engineers and this provides a steady flow. There are pressures from neighbouring states, such as Georgia, to divert some waters from Tennessee. The *Inter-basin Act* was designed to ensure that transfers occur only among the basins defined in the legislation within Tennessee and under specified terms and conditions.

3.12.2 Water Availability for Consumptive Use

Water is available for use other than where restricted by water quality constraints in areas designated for public water supply or to meet instream flows. In the past, the state has vetoed federal water permits where these permits would have jeopardized endangered species or seriously altered species habitat.

3.12.3 Right to Take and Use Water

Riparian land owners have the right to use the water in the stream in a manner that does not damage other riparian users without their consent. However, most water users whose average withdrawals exceed 10,000 gallons per day (14 dam^3 per year) must register with the Department of Environment and Conservation. Exceptions include water used for agricultural purposes (irrigation and livestock watering), non-recurring water withdrawals, and emergency use. Registrations specify the total volume that can be used, the diversion and return flow points, the rate of diversion and nature of use (purpose). Registrations must be renewed annually. There is no priority among registered water users. Registered users are required to report daily volume withdrawn, return flow, and purpose of water use.

3.12.4 Process of Acquiring Rights to Take and Use Water

While water users must register their use, they must also apply for an Aquatic Resource Alteration Permit (ARAP) that allows them to build and operate structures (*e.g.* diversion channel, intake structure) in and around a water course. Factors considered in evaluating an application for an ARAP include: the quantity of withdrawal from sources where low flow is a concern; protection of present and projected water uses; effects on quality during low flow periods; whether the water is for beneficial use; the ability of the water source to respond to emergencies such as drought; and effects on navigation, power generation, fish and wildlife, aesthetics and recreation. Applications for an ARAP have requirements for public notification. Applicants or permittees can appeal the decision regarding the issuance of a permit to the Water Quality Control Board.

3.12.5 Administration and Enforcement

Water users in Tennessee pay an annual fee for permits based on the length of riparian land affected. This fee is payable annually when permits are renewed. Water users are required to file reports of their water use each year when they renew their registrations. Water users are required to maintain historical records dating back three years. A permit can be modified, suspended, or revoked for violations of terms of permit terms and conditions or causing pollution, or as a result of changes in legislation or the physical conditions of the water.

3.13 UTAH

3.13.1 Type of Water Rights System

Utah employs a prior appropriation system of water rights where priority among users is based on purpose as well as first in time, first in right.

3.13.2 Water Availability for Consumptive Use

The amount of water available for water use is determined by the State Engineer who may withhold approval of an application if the proposed appropriation will unreasonably affect public recreation or the natural stream environment, or be detrimental to the public welfare. Unappropriated water may not be allocated for instream purposes. However, the government can acquire existing rights and use them for the purpose of instream flows.

3.13.3 Right to Take and Use Water

Persons who wish to use water, even in small amounts, must apply to the State Engineer for a water right. The legislation recognises the following as being beneficial uses: domestic use, irrigation, stockwatering, municipal, instream flow, storage, and industrial, mining, milling, and hydropower generation. Once the water right is recognized, appropriators can use water for the specific purpose from a specific source for a specific volume to be diverted at a specified rate. All water users have a continuing obligation to use their entire water right for beneficial purposes.

In times of scarcity, water use for domestic purposes (without waste) has highest priority, and agricultural use has second highest priority. Priority among persons using water for the same purposes is based on the priority date based on the date of application.

3.13.4 Process of Acquiring Rights to Take and Use Water

Applications for a water right, including an application fee, must be submitted to the State Engineer. In evaluating the application, the State engineer must determine whether there is unappropriated water in the source, if the proposed use will not impair existing rights or interfere with a more beneficial use of the water, if the proposed plan is physically and economically feasible and not detrimental to the public welfare, the applicant has the financial ability to complete the project, and if the application was filed in good faith and not for the purposes of speculation of monopoly. The State Engineer publishes a notice of application in a local newspaper and interested parties may file a protest within 20 days. Any person who is aggrieved by an order of the State Engineer may obtain a judicial review of the order.

If an appropriator abandons or ceases to use their water right for a period of five years, the right or unused portion reverts to the public. Approval for permanent or temporary changes to the point of diversion, place of use of purpose can be obtained from the State Engineer, and the process is the same as for acquiring a new water right.

3.13.5 Administration and Enforcement

There are no requirements for annual water use fees or reporting. In the cases of a perceived violation, the State Engineer issues an initial order, either a notice of violation or a cease and desist order, then issues a final order to enforce compliance. Both administrative and criminal penalties can be imposed.

3.14 WYOMING

3.14.1 Type of Water Rights System

Wyoming uses a prior appropriation system based on fist in right, first in time, where priority is based on the date of acceptance by the State Engineer. A permit system has been developed for administrative purposes.

3.14.2 Water Availability for Consumptive Use

All water is available for appropriation, so the Wyoming Water Development Commission files applications on behalf of the state to appropriate water for instream flows, as recommended by the Fish and Game Commission. However, water may only be appropriated for instream uses if the appropriation does not impair or diminish the rights of any other water user.

3.14.3 Right to Take and Use Water

Anyone seeking to acquire the right to the beneficial use of public water must apply to the State Engineer for a permit to develop a water project and then receive a Certificate of Appropriation once the project has been completed. Permits are issued for five purposes: transporting water through a ditch or pipeline, storage in reservoirs, storage in smaller purposes for livestock or wildlife purposes, enlargement of an existing ditch or storage facilities, and instream flow purposes. Permits specify the purpose and place of diversion of the water. While licence seniority is based on the priority date, the statute lists the following order of preference: drinking water (humans and livestock); municipal purposes; steam engines, railway use, cooking, laundry, bathing, refrigeration, steam and hot water plants; and industrial purposes.

3.14.4 Process of Acquiring Rights to Take and Use Water

An application form and administration fee must be submitted to the State Engineer. The application is evaluated and, if approved, a permit will be issued that allows development of a water project that must be commenced within one year and completed within five years. Once the project is completed, a notice of completion and a notice of beneficial use are submitted to the Board of Control. If accepted, a Certificate of Appropriation is issued. This is listed as an adjudicated right that is permanently attached to the specific land or place of use. The final proof of appropriation is published in a local newspaper and parties can appeal the decision to the Board of Control, and the decision of the Board of Control can be appealed to the District Court.

A simplified process is used for certain types of projects, including small reservoirs for stock purposes, fishing reserve water or wetland ponds; small flood protection dams; or development of springs for stock or domestic uses requiring less that 25 gallons per minute (or 50 dam^3 per year).

3.14.5 Administration and Enforcement

If a permit is not used for beneficial purposes for five years it is considered to be abandoned. The State Engineer can request the Attorney General to bring a suite for unlawful appropriation, diversion, or use of water and may seek a temporary restraining order, preliminary or permanent injunction. The State Engineer or Board of Control can also issue a written notice of violation that can include a fine or imprisonment. There appears to be no requirement for reporting of water use.

3.15 SUMMARY

3.15.1 Type of Water Rights System

The states and provinces considered in the assessment apply three general approaches to manage water. Table 1 shows the approaches used by each jurisdiction.

Table 1: Summary of Water Allocations Systems by Jurisdiction

Province/State	Riparian	Prior Allocation	Prior Appropriation
Alberta	✓	✓	
British Columbia		✓	
Saskatchewan	✓	✓	
Manitoba	✓	✓	
Ontario	✓		
Arizona			✓
California	✓		✓
Colorado			✓
Montana			✓
North Carolina	✓		
North Dakota	✓		✓
Tennessee	✓		
Utah			✓
Wyoming			✓

Ontario, North Carolina and Tennessee each employ a riparian system where people living adjacent to water bodies are allowed to take water in a manner that does not adversely affect other riparian users within the watershed. Riparian users can "take" water, but it is not considered a right. Shortages of water are shared equally among users. The only key

difference between Ontario and the two eastern states is that the two states require that water be used for beneficial purposes; there is no corresponding concept in Ontario. All three jurisdictions have developed administrative systems for keeping track of water use that require water users to register with the state or acquire water use permits.

All of the western states use what they call a prior appropriation system, although there are some differences among states in terms of nature of water rights recognized and how their systems are administered. With the exception of California and North Dakota, where limited riparian rights are still recognized, water rights can only be acquired by appropriating the water and putting to some form of beneficial use specifically recognized in legislation. In some states, water for instream flows is recognized as a beneficial use; in other states it is not (North Dakota). In most states, seniority among users in times of shortage is based on a priority date that is tied to the date of first use. However, some states, such as California and Utah, give highest priority to domestic and agricultural water users, with seniority within purposes based on the priority date. While all western states originally based water rights on appropriation, where disputes among users are settled in the courts, all of the states except Colorado have developed an administrative system that requires new water users to apply for a permit or licence to appropriate water. Such administrative systems were introduced as early as 1914 in California, 1919 in Arizona, 1955 in North Dakota, and 1973 in Montana. By adopting administrative systems that require applications, set out the tests for approval, and require notification of other water users, these states are now practicing a system of prior allocation, rather than the pure appropriate system that really only now continues to exist in Colorado. In all cases, appropriative rights can be forfeited for non use, severed from the land, and may be transferred to other uses.

For the most part, all four western Canadian provinces use a prior allocation system where water users must apply for a licence to divert and use water. Alberta, Saskatchewan, and Manitoba all recognize a limited form of riparian rights, while British Columbia does not. There is no explicit requirement to demonstrate beneficial use in any of the provinces, as is required by the prior appropriation systems used in the western United States. In times of shortage, three of the four Canadian provinces assign seniority in terms of the priority date issued when the licence application was received. While Saskatchewan has some older licence with priority dates, no priorities have been assigned to licences issued since 1984 and all licensees are expected to share water shortages equally.

3.15.2 Water Availability for Consumptive Use

Riparian systems are more amenable to including allowances for instream purposes as conditions in permits, because riparian users are only allowed to take water in a manner that does not adversely affect other users (typically downstream users). Riparian systems are unable to allocate specific amounts for any specific purpose including instream uses. However, jurisdictions that use riparian-based systems have the ability to designate high use areas where more stringent rules apply or water permit applications can be denied: Ontario has designated some areas as "high use watersheds" and North Carolina designates "capacity use areas".

Under the prior appropriation systems, any water that was not already appropriated could be used for beneficial purposes and, at the time, use of water for instream flows was not considered to be a beneficial use. All western states considered in this assessment except North Dakota now identify instream flows as a beneficial use, such that water can now be appropriated for this use, either through new licences or permits, or through the transfer of existing appropriations being used for other purposes. In Colorado only the state may appropriate water for instream purposes but these rights typically require adjudication in the courts. In Utah and Wyoming, state agencies are responsible for appropriating water for instream purposes.

Under the prior allocation system, requirements for instream needs are typically included as terms and conditions in water licences. However, as a matter of policy, Saskatchewan limits allocations to 50 percent of flows. While Alberta and British Columbia can both issue licences for instream purposes, this provision under the *Fish Protection Act* has never been used. An instream licences was issued to the Wagner Bog Society under the *Alberta Water Resources Act* to keep water within the bog. Both Alberta and British Columbia can also reserve unallocated water.

3.15.3 Right to Take and Use Water

In all jurisdictions, the province or states claim title to or ownership of all water.

There are no formal rights to water under a riparian system. Riparian landowners have the ability to take and use water in a manner that does not affect other users. Riparian rights cannot be cancelled, severed from the land, or transferred. As noted earlier, Ontario, North Carolina and Tennessee have implemented administrative systems to keep track of water use.

Water rights acquired under a prior appropriation system are considered to be property rights in that they can be used as equity in obtaining financing and, except for non use, cannot be taken away without due process and compensation for loss of value. In all cases, appropriative rights can be forfeited for non use, severed from the land, and may be transferred to other uses.

Water rights issued under prior allocations provide the right to divert water. All the western provinces have the power to cancel licences that are not being used, although there is some variability in the test used to determine whether a licence is still being used (in Alberta a Director must reasonably believe that there is no prospect that the water will be used again). In Manitoba and Saskatchewan water rights cannot be severed from the land or transferred to another user, except when the land is sold. In British Columbia, water rights can be transferred to another piece of land (appurtenancy). Alberta legislation allows water licences, but not registrations, to be transferred to other users.

3.15.4 Process of Acquiring Rights to Take and Use Water

The states and provinces use a combination of permits, registrations, and licences to keep track of water takings, appropriations, and allocations. These instruments typically identify the water source, the diversion point, the purpose of use, the maximum rate of withdrawal, and the maximum volume that can be withdrawn.

The process of obtaining the required permits or licences is fairly similar in all the provinces and states examined in this study. Typically, this involves submitting an application and a fee to a regulatory body which considers existing obligations and may consider environmental factors and public concerns prior to making a decision. Exceptions are Tennessee where water users above a certain size are merely required to register with the state and North Carolina where there are no requirements for permit or registration below a threshold volume.

Most administration systems require that, in evaluating a proposal for a new water right or taking, other water users be consulted and given the opportunity to comment. There is always at least a limited right to appeal decisions to issue permits or licences, either to another agency (appeal boards in Canada and eastern U.S.) or to the courts (western U.S.).

3.15.5 Administration and Enforcement

Nearly all of the states and provinces have similar approaches to enforcement, where both orders to cease or change activities can be issued, and penalties levied. One difference is that in the states, non use of an appropriated right for more than five years typically results in forfeiture of the right with no compensation. Another difference is that because appropriation rights are property rights, people holding these rights have the ability to sue for interference with the right.

There are significant differences among jurisdictions with respect to monitoring and reporting of water use. The requirements for each jurisdiction are reported in Table 2. .

Table 2: Summary of Water Use Reporting and Annual Fees by Jurisdiction

Province/State	Monitoring Water Use	Reporting Water Use	Annual Fees
Alberta	Partial	Partial	No
British Columbia	Yes	Upon request	Yes
Saskatchewan	All licences	All licences	Some
Manitoba	Yes	Upon request	Industrial
Ontario	Yes	Yes	Industrial & commercial proposed
Arizona	State deliveries	State deliveries	No
California	Yes	Yes	State deliveries
Colorado	State monitors	State reports	No
Montana	May be required		No
North Carolina	Most	Most	No
North Dakota	Yes	Yes	No
Tennessee	Yes	Yes	Annual Renewal Fee
Utah	State monitors	May be required	No
Wyoming	State monitors	May be required	No

Ten of the jurisdictions require monitoring by some if not all licensees or permittees, and most of these also require that the water use information be reported. The majority of jurisdictions do not levy annual water use fees, the exceptions being all of the Canadian provinces except Alberta

4.0 DRAINAGE BASINS AND WATER TRANSFERS: AN OVERVIEW

Before describing how water legislation addresses inter- and intra-basin transfers, it is necessary to have some understanding of how the various jurisdictions define drainage or river basins. While there is general agreement as to what constitutes a "continental" basin within North America, the definition of major basin or watershed used in some jurisdictions is comparable to what other jurisdictions might consider a sub-basin. This makes inter-jurisdictional comparisons of the rules related to water transfers problematic. To help unravel this problem, the first half of this section describes the basin naming conventions used in Canada and the United States. The second half provides an overview of water transfers, and the challenges and opportunities they present.

4.1 DRAINAGE BASINS

4.1.1 Hydrometric Monitoring in Canada

In support of hydrometric monitoring, the Water Survey of Canada (WSC) has developed an administrative system that defines drainage basins using a hierarchical system that differentiates between major basins (five), major drainage areas (11), river basins, and sub-basins. The five major basins correspond to what are termed "continental basins" which describe areas that ultimately drains to an ocean. There are five continental basins in Canada; these drain into the Atlantic, Pacific and Arctic oceans, the Hudson Bay and the Gulf of Mexico. Alberta is situated in three of these continental drainage basins.

The WSC has developed a system of gauging stations that collects stream flow information and these stations are managed using a hierarchical system of major drainage basins, river basins and sub-basins. Figure 2 shows the major drainage areas in Ontario and the western provinces. Individual drainage areas are numbered 01 to 11. As shown in Figure 2, the Hudson Bay continental basin is comprised of four major drainage areas: Northern Quebec and Labrador (03), Southwestern Hudson Bay (04), Nelson River (05), and Western and Northern Hudson Bay (06). The Arctic Ocean continental basin consists of three major drainages areas: Great Slave Lake (07), Yukon (09) and Arctic (10). Table 3 shows that all of the provinces considered in this assessment are situated in three or more of major drainage areas and Alberta is situated in five major drainages; this is more than any other province.

The WSC then denotes individual river basins using the drainage area number and a letter. For example, the Nelson Drainage has been divided into 20 individual river basins. While some of the river basins identified by the WSC coincide with how the Canadian provinces define river basins, others do not. In the case of the Nelson Drainage, WSC river basin 05B corresponds to the Bow River basin, but the North Saskatchewan River basin in Alberta actually consists of two WSC river basins (05D and 05E). The WSC has defined sub-basins in terms of the drainage area number and two letters. For example, the Elbow River sub-basin, a tributary of the Bow River, is recorded as 05BK. WSC sub-basins may or may not correspond to the sub-basins definitions used by the individual provinces.

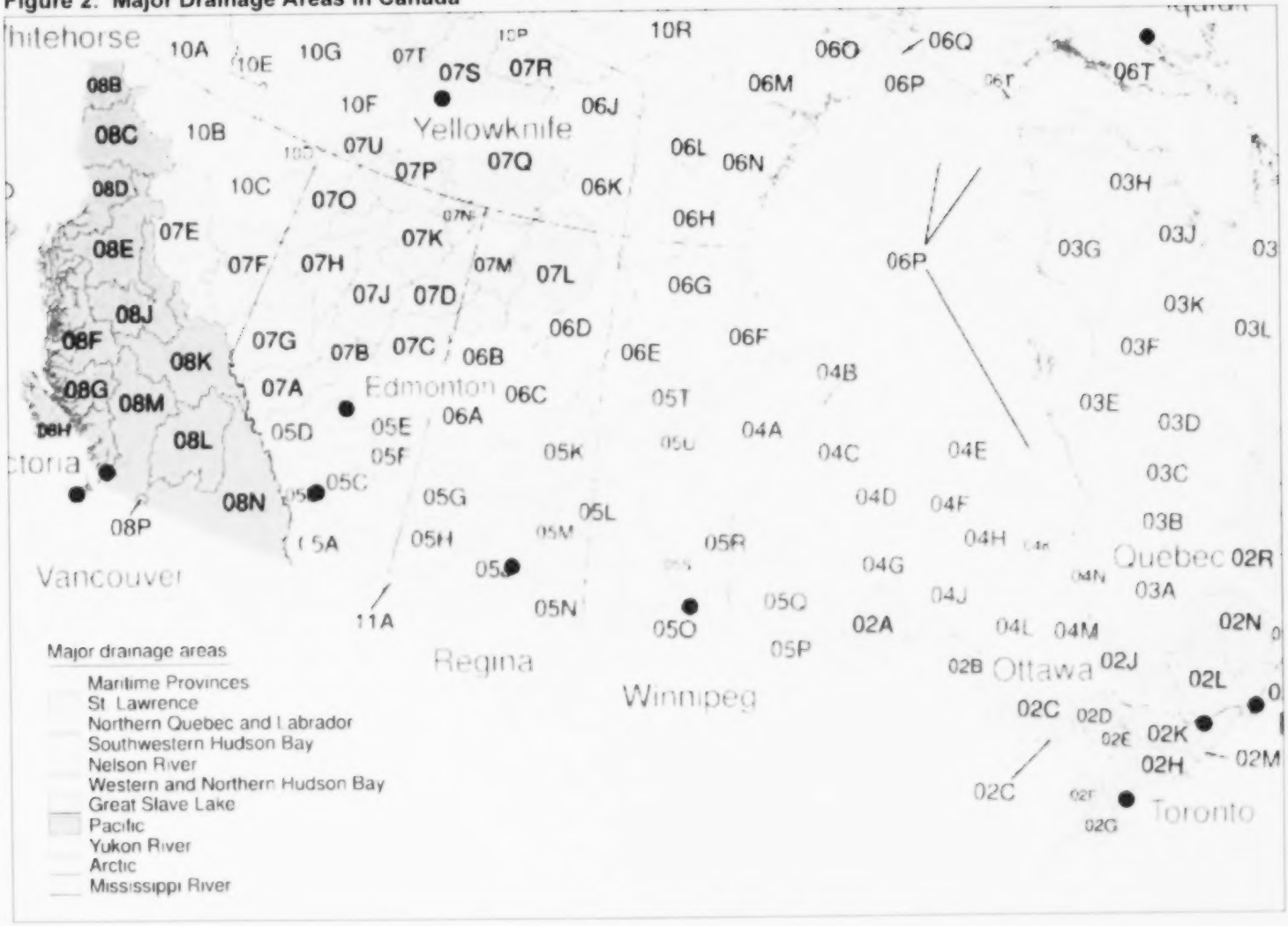
Table 3: Major Drainage Areas in Each Province

Continental Basin	WSC Major Drainage Area (Number)	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario
Lands Draining into the Pacific Ocean	Pacific (08)	7				
Lands Draining into the Arctic Ocean	Arctic (10)	1	1			
	Great Slave Lake (07))		2	1		
	Yukon (09	1				
Lands Draining into Hudson Bay	Western and Northern Hudson Bay (06)		1	1	1	
	Nelson River (05)		2	1	1	1
	Southwestern Hudson Bay (04)				1	1
Lands Draining into the Gulf of Mexico	Mississippi River (11)		1	1		
Lands Draining into the Arctic Ocean	St. Lawrence (02)					4
TOTAL		9	7	4	3	6

For purposes of water management individual provinces have developed legislation and regulations that may or may not use the WSC definitions of basins and sub-basins. Thus, the meaning of terms such as "inter-basin transfer" or intra-basin transfer" differs among provinces and is dependent on the definitions of basins, watersheds and/or sub-basins that are included in provincial legislation and regulations.

Figure 2: Major Drainage Areas in Canada

Figure 2: Major Drainage Areas in Canada



4.1.2 United States

The United Sates uses a similar hierarchical system to classify river basins and watersheds. According to the US Geological Survey (2007), drainage systems are classified in terms of regions, sub-regions, accounting units and cataloguing units. A description of these terms is provided in Table 4 and a map showing the 20 major water regions in the United States is provided in Figure 3.

Table 4: Classification System for Drainage Areas in the United States

Classification	Description	Code
Region	Large drainage areas, major rivers or several rivers Used for corporate planning	2 digits (01 to 20)
Sub-Region	River system, reach of river and tributaries, closed basin, or group of streams forming a coastal drainage area	Regional code plus 2 additional digits
Accounting Unit	Subdivisions of sub-region used for managing water information	Sub-regional code plus 2 additional digits
Cataloguing Unit	Smallest unit, but larger than 700 square miles	Accounting Unit plus 2 additional digits

Figure 3: Major Water Regions in the United States

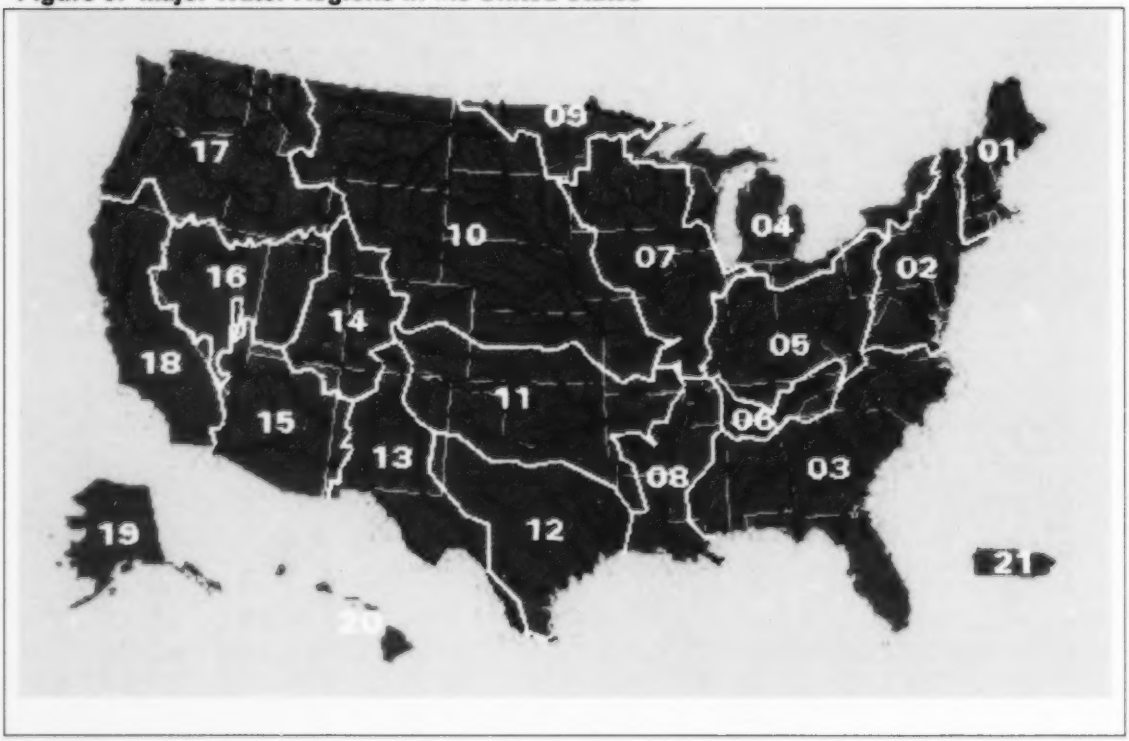


Table 5: Number of Major Water Regions in Each State

Continental Basin	Major Hydrologic Region (Regional Code)	Arizona	California	Colorado	Montana	North Carolina	North Dakota	Tennessee	Utah	Wyoming
Lands Draining into the Pacific Ocean	California (18)		10							
	Pacific Northwest (17)				1					1
Non-draining Basin	Great Basin (16)		1						7	1
Lands Draining into the Gulf of California	Lower Colorado (15)	13							1	
	Upper Colorado (14)	1		1					3	2
Lands Draining into the Gulf of Mexico	Rio Grande (13)			1						
	Texas Gulf (12)									
	Arkansas–White-Red (11)			1						
	Missouri (10)			1	3		8			9
	Lower Mississippi (08)							1		
	Upper Mississippi (07)									
	Tennessee (06)					4		5		
	Ohio (05)					1		3		
Lands Draining into Hudson Bay	Souris – Red - Rainy (09)						5			
Lands Draining into the Atlantic Ocean	Great Lakes (04)									
	South Atlantic – Gulf (03)					13		1		
	Mid Atlantic (02)									
	New England (01)									
TOTAL		14	10	4	4	18	13	10	11	13

The overlap between the continental basins, the 18 major water regions, and the nine states included in this assessment are shown in Table 5. It shows that, with the exception of Wyoming, the rivers in most states are part of at most two continental basins. Rivers in Wyoming are situated in four continental basins, one of which is the Great Basin which does not flow into any ocean.

Table 5 also identifies the number of major river basins or drainages within each major hydrologic region in each state. There are considerable differences among states in how these basins are identified. For Colorado, the four major river basins correspond to the four regions. In other states, individual regions can be comprised of up to 13 "major" river basins, based on the administration definitions contained in water management legislation or policies. Thus, each of the states has a different interpretation of what constitutes "inter-basin" and "intra-basin" transfers.

4.2 AN OVERVIEW OF WATER TRANSFERS AMONG BASINS IN CANADA

Water diversions in Canada are very significant (Day and Quinn 1992). As of 2003 there were 54 projects that can divert a total of 4,400 cubic metres per second (m^3/s). This flow represents the amount of water diverted through structures where the diverted flow does not return to the stream of origin or parent stream within 25 kilometres of the point of diversion/withdrawal, and the mean annual diverted flow is not less than a rate of 1.0 cubic metre per second. The number of such projects in selected Canadian provinces is provided in Table 6, and includes both inter- and intra-basin transfers.

Table 6: Inter-Basin Water Transfers by Province

	Diversions	Average Annual Flow (m^3/s)	Major Use
Alberta	9	117	Irrigation
British Columbia	9	361	Hydro-electric power
Saskatchewan	5	30	Hydro-electric power
Manitoba	5	779	Hydro-electric power
Ontario	9	564	Hydro-electric power
Quebec	6	1854	Hydro-electric power
Canada	54	4,450	Hydro-electric power

Source: Statistics Canada, 2003

In combination, the volume of water diverted by these projects would be large enough to be the equivalent of Canada's third largest river. The largest water diversion project in the provinces being assessed in this study is the Churchill River project in Manitoba. Large diversion projects in other provinces include La Grande (Quebec), and Churchill Falls (Newfoundland and Labrador). Most diversions are within a province rather than across provincial boundaries.

Day and Quinn (1992) suggest that water diversions have been implemented for four different reasons:

(1) to increase water supplies for growth sectors of the community or region (e.g. for irrigation, such as the St Mary's Irrigation District),

(2) to divert watercourse in order to protect an area (e.g. Portage Diversion, Manitoba),
(3) to increase the carrying capacity of a watercourse (e.g. to carry logs, Allagash River, New Brunswick) and
(4) to divert to increase volumes for hydro electric generating purposes (e.g. James Bay).

In the broader North American context, other reasons for diversions include sewage dilution (e.g., the Chicago Diversion (Benidickson, 2007)). While water has been diverted for this range of purposes, Quinn et al (2004) suggest that 97 percent of diversions by volume in Canada occur for generating hydroelectric power, and no other country diverts as nearly as much water as Canada for the single purpose of hydroelectric power generation. In the US, irrigation or municipal purposes are the principal reasons for diverting water. Quinn et al. suggest that the need for further water diversions in most parts of Canada is expected to be driven in large part by growing demands for electricity south of the border.

As shown in Table 6, the water diversions undertaken to date in Alberta relate to smaller scale, highly consumptive water uses such as irrigation whereas diversions in most other provinces have involved larger volumes of water being diverted for hydro-electric power, which involves very little actual water consumption. In this regard, the types of water diversions occurring in Alberta more closely resemble the types of diversions allowed in the US rathre than the diversion projects found in other parts of Canada.

There are numerous concerns about diverting water from one basin to another. These include the transfer of biota between continental basins (such as between Garrison Diversion, which diverts water from the Missouri drainage to the Hudson Bay drainage, and Devil's Lake, which diverts water from a closed basin to the Hudson Bay drainage); the effects on intensity and volume of spring freshets; socio-economic impacts on basin residents (including physical relocation) especially aboriginal peoples (e.g. Nechako/Kemano in BC and Churchill\Nelson in Manitoba); reducing lake levels for navigation, hydro and recreational\aesthetic purposes (e.g. Chicago Diversion, Great Lakes into the Mississippi); erosion associated with increased volumes (e.g. Lake Nipigon and Long Lake diversions in Ontario); dewatering of rivers and associated damage to fishery resources (Kemano/Nechako and Eastmain and Opinaca Rivers, Quebec) and similarly increased sedimentation in other rivers (Lake Nipigon, Ogoki Diversion); safety issues where a waterbody is dewatered but then occasionally used); and credits (hydro) for transfers. Some diversions include storage projects that can trigger a range of other issues such as local climate changes, geology/seismicity issues, water chemistry (mercury), disruption in transportation patterns; habitat loss (especially bottom land in mountainous regions); and ramping rates associated with the operation of storage for peaking purposes.

Much of the international literature on diversions focuses on issues associated with major storage facilities and dewatering that occurs in the contributing basin. And, consistent with the recommendations of the World Commission on Dams (2000) the recent literature increasingly emphasizes the need to examine and exhaust all other options before considering basin transfers. Thus, Ghassemi and White (2007: 24) suggest the need to:

(1) eliminate losses in current water supply networks;
(2) increase water use efficiencies;

(3) make conjunctive use of surface and groundwater resources;
(4) increase water prices to promote water use efficiency and shift water use from low value to higher value production systems;
(5) reclaim waste water in municipal areas;
(6) review policy and regulations;
(7) improve monitoring; and
(8) build dams (where required) in the receiving basin rather than in the contributing basin.

These authors observe that even if the source basin seems to have an excess of water to support a transfer, there must be a careful assessment of long-term potential requirements for a range of uses and of the implications of climate change.

Both the Canadian and the international literature observe that many existing transfer projects were constructed at times when decisions on such major developments could be made by engineers and politicians without the need for much if any public consultation and with limited environmental assessments. Day and Quinn emphasized that up to 1992, it was common to develop transfer projects without consulting with indigenous peoples who would be most directly affected (settlement re-location, mercury contamination, disruption in travel patterns etc). Compensation schemes, if developed (e.g. the Northern Flood Agreement) emerged as a response to crises rather than as an up-front part of project planning. Several case studies exist on the implications of major transfer projects for indigenous people including a series of case studies in Day and Quinn (1992) and Waldram (1988) who examines the Churchill\Nelson project and the Northern Flood Agreement as well as Richardson's (1975) more populist account of the James Bay project.

It is now broadly accepted that the historical approach to water management is now unacceptable and that water transfers should only be considered within a framework of public participation that involves all those who may be affected along with an exhaustive assessment of all of the impacts including environmental flow assessments of both source and receiving water courses. Proposals need to consider all alternatives and must be able to demonstrate that the benefits are much greater than the benefits of any non-transfer alternative. More generally, the World Commission on Dams (2000) (and discussing major dam projects rather than the more specific case of transfers) has suggested seven strategic priorities and related policy principles for decision making. These are:

(1) the importance of gaining public acceptance especially of indigenous peoples and other vulnerable peoples is essential for equitable and sustainable resource developments;
(2) comprehensive exploration and participatory assessment of policy, institutional and technical options;
(3) re-assessment of existing dams;
(4) sustaining rivers and livelihoods and recognizing that rivers watershed and aquatic ecosystems are an essential basis of the livelihoods of communities;
(5) recognizing the entitlements of existing users who will be affected and sharing the project benefits;
(6) ensuring compliance; and
(7) emphasizing the importance of sharing international rivers peacefully.

One of the more recent issues about water transfers between major river basins relates to the potential for bulk water exports to the United States. In 1999 the Government of Canada announced a strategy to prohibit the bulk removal of water from major Canadian water basins (Johansen, 2007). The strategy included three elements. The first element consisted of amendments to the International Boundary Waters Treaty Act, enacted in 2002, that prohibit the bulk removal of water out of the Canadian portion of boundary basins between Canada and the United States, including the Great Lakes – St. Lawrence Basin, the Hudson Bay Basin and the Saint John – St. Croix Basin. The second element was a request to the International Joint Commission (IJC) to study the effects of water consumption, diversion and removal, including for export from the Great Lakes. The resulting IJC study concluded that the Great Lakes needed protection, and the amendments to the International Boundary Waters Treaty Act support the IJC's recommendations for action. The third element was a proposed Canada-wide accord on bulk water removals.

The proposed accord[35] committed the provinces and territories to "prohibit the bulk removal of water from Canadian portions of major drainage basins" but recognized that "(e)ach jurisdiction will determine its own approach and will report on implementation to their respective constituents before December 2000". The accord specifically notes five major drainage basins, those being those parts of Canada that drain into the Atlantic, Arctic or Pacific oceans, Hudson Bay, or the Gulf of Mexico. According to Johansen (2007), the accord was discussed by the Canadian Council of Ministers of the Environment in 1999 and 2000 but Quebec and the western provinces refused to sign the accord as presented. However, subsequent to discussion of the accord, concerns about inter-basin transfers for the bulk removal of water from Canada has resulted in provinces working to develop legislation or regulations that would effectively prohibit bulk water removal within their respective jurisdictions. The specific actions taken by each of the four western provinces and Ontario with respect to inter- and intra-basin transfers are provided in Section 5.0.

[35] A copy of the Accord for the Prohibition of Bulk Water Removal from Drainage Basins can be found at http://www.scics.gc.ca/pdf/accord.pdf

5.0 SUMMARY OF LEGISLATION RELATED TO WATER TRANSFERS

5.1 CANADA

Although the provinces have the primary responsibility for water management, the Government of Canada has jurisdiction over international boundary waters to the extent specified in the *1909 Boundary Waters Treaty*. To address concerns over bulk water removal, the *International Boundary Waters Treaty Act* was amended to prohibit the bulk removal of water from boundary waters and taking the water outside the basin in which the boundary waters are located. The amendment came into force in December 2002. The associated *International Boundary Waters Regulations* note that removal of water in bulk refers to diversions in excess of 50,000 litres per day (or 18.25 dam^3 per year) by pipeline, canal, tunnel, aqueduct or channel, and the prohibition only relates to the Great Lakes – St. Lawrence Basin, the Hudson Bay Basin, and the Saint John- St. Croix Basin. It is important to emphasize that the federal legislation only applies to boundary waters, as defined in the treaty (water along which the boundary travels), and does not deal with trans-boundary water. Thus, while the Canadian prohibition on bulk transfers or exports potentially affects water management in New Brunswick, Quebec, and Ontario, it is likely of less significance in the provinces of Saskatchewan and Alberta where the key concerns relate to trans-boundary waters rather than boundary waters.

5.2 ALBERTA

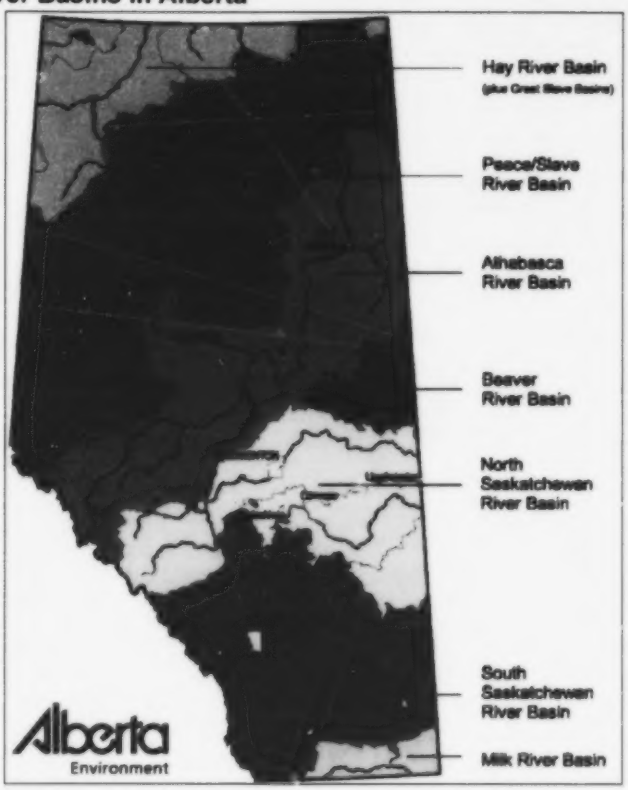
Alberta straddles three continental basins. While the majority of the province drains north into the Mackenzie River system and the Arctic Ocean, most of southern and east central Alberta drains east into Hudson Bay via the Nelson and Churchill River systems. Lands in the extreme south of Alberta drain into the Missouri and Mississippi rivers and eventually to the Gulf of Mexico.

The Alberta *Water Act*, which came into force in 1999, defines seven major river basins. These major river basins are identified in Table 7. It is noteworthy that the *Water Act* does not specifically mention of the Liard River Basin which eventually drains into the Arctic Ocean.

Table 7: Major River Basins in Alberta

Continental Basin	Major Drainage Area (WSC Number)	Major River Basins (Alberta Environment)
Lands Draining into the Arctic Ocean	Great Slave Lake (7)	Athabasca River basin
		Peace /Slave River basin
		Hay River basin
Lands Draining into Hudson Bay	Western and Northern Hudson Bay (6)	Beaver River basin
	Nelson River (5)	North Saskatchewan basin
		South Saskatchewan basin
Lands Draining into the Gulf of Mexico	Mississippi River (11)	Milk River Basin

Figure 4: Major River Basins in Alberta



5.2.1 Inter-Basin Transfers

Under the *Water Act*, a Director, as defined in the legislation, cannot authorize the transfer of water between major river basins, as defined in the legislation, unless the licence is specifically authorized by a special Act of the Legislature. This provision did not exist in previous legislation.

Applications for licences for inter-basin transfers can be made for any amount or for any purpose but there is a requirement for the Minister to consult with the public. If the legislature approves an act authorizing the transfer, a licence will be issued that specifies the terms and conditions and would be similar to any other licence. If the application would involve construction of a large structure (a dam more than 15 metres in height) or a large volume of water (diversions exceeding 15 cubic metres per second or a reservoir with a capacity of more than 30 million cubic metres) an environmental impact assessment would be required, involving a review by the Natural Resources Conservation board to determine whether the project was in the public interest. Since the *Water Act* was proclaimed in 1999 there have been at least three special acts allowing the transfer of small amounts of water from the South Saskatchewan River basin (Red Deer) to the North Saskatchewan River basin (Battle) for municipal purposes. More applications are expected.

Figure 4: Major River Basins in Alberta

5.2.1 Inter-Basin Transfers

Under the *Water Act*, a Director, as defined in the legislation, cannot authorize the transfer of water between major river basins, as defined in the legislation, unless the licence is specifically authorized by a special Act of the Legislature. This provision did not exist in previous legislation.

Applications for licences for inter-basin transfers can be made for any amount or for any purpose but there is a requirement for the Minister to consult with the public. If the legislature approves an act authorizing the transfer, a licence will be issued that specifies the terms and conditions and would be similar to any other licence. If the application would involve construction of a large structure (a dam more than 15 metres in height) or a large volume of water (diversions exceeding 15 cubic metres per second or a reservoir with a capacity of more than 30 million cubic metres) an environmental impact assessment would be required, involving a review by the Natural Resources Conservation board to determine whether the project was in the public interest. Since the *Water Act* was proclaimed in 1999 there have been at least three special acts allowing the transfer of small amounts of water from the South Saskatchewan River basin (Red Deer) to the North Saskatchewan River basin (Battle) for municipal purposes. More applications are expected.

5.2.2 Intra-Basin Transfers

The *Water Act* does not contain any prohibitions against intra-basin transfer and sub-basins are not defined. A sub-basin can be any sub-drainage unit of one of the major river basin defined in the *Water Act*. There have been intra-basin transfers approved in the past, the most recently being the movement of additional water from the Highwood sub-basin (Bow Basin) into the Little Bow River sub-basin (Oldman basin)[36]. Because of the scale of the diversion, this project required a public review by the Natural Resources Conservation Board to determine whether the project was in the public interest. This hearing was conducted in conjunction with the Canadian Environmental Assessment Agency because the proposed project would require a permit under the federal *Fisheries Act*. The Joint Review Panel decision gave provincial approval to the project and recommended that the Minister of Environment approve the project, subject to certain terms and conditions. Following project approval, a water licence was issued. Presumably applications for large diversions for intra-basin transfers would follow a similar process, while small projects would only have to apply for a water licence.

5.3 BRITISH COLUMBIA

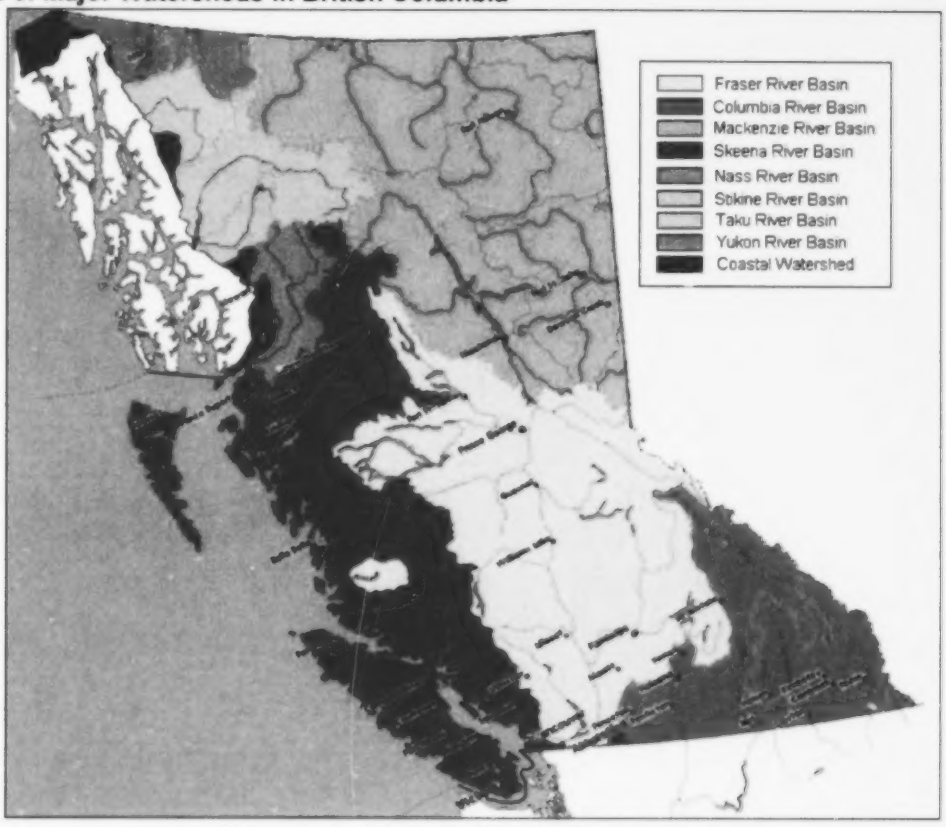
Lands in British Columbia straddle two continental basins. Most of BC drains directly into the Pacific Ocean. However, water in northeast and northern BC winds up in the Arctic Ocean either though the Mackenzie or Yukon River systems. BC specifically identifies nine major watersheds in its legislation. Each of these watersheds drains into either the Arctic or Pacific oceans. The nine watersheds are shown in Figure 5 and include the Fraser, the Mackenzie, the Columbia, the Skeena, the Nass, the Stikine, the Taku, the Yukon, and the Coastal watershed (all others).

Table 8: Major Watersheds in British Columbia

Continental Basin	Major Drainage Area (WSC Number)	Watersheds
Lands Draining into the Pacific Ocean	Pacific (08)	Fraser Columbia Skeena Nass Stikine Taku Coastal watershed
Lands Draining into the Arctic Ocean	Great Slave Lake (07) Arctic (10)	Mackenzie
	Yukon River (09)	Yukon

[36] Note that Alberta's *Water Act* defines the Bow, Oldman, Red Deer and South Saskatchewan as one basin.

Figure 5: Major Watersheds in British Columbia



5.3.1 Inter-Basin Transfers

Under BC legislation a person may not remove water from BC or construct or operation a large-scale project that is capable of transferring water from one major watershed to another. Large-scale projects are those that allow diversions of 10 or more cubic metres per second (or 315,360 dam^3 per year).

Anyone wishing to transfer more than 10 cubic metres of water per second from one major watershed to another would be required to obtain a water licence. Applications for water licences would the be evaluated in terms of any applicable approved water management plan (including the Columbia Basin Management Plan); potential impacts on existing licence holders or earlier applicants, minimum instream flow requirements, landowner or Crown land tenure holders, other agencies and the interests of First Nations; and any objections received.

5.3.2 Intra-Basin Transfers

There is nothing in British Columbia legislation that prohibits the transfer of water between sub-basins. Consequently, a water user could submit an application for a right to divert water from one sub-basin for use in another sub-basin and this would be treated the same as any other application for a water licence.

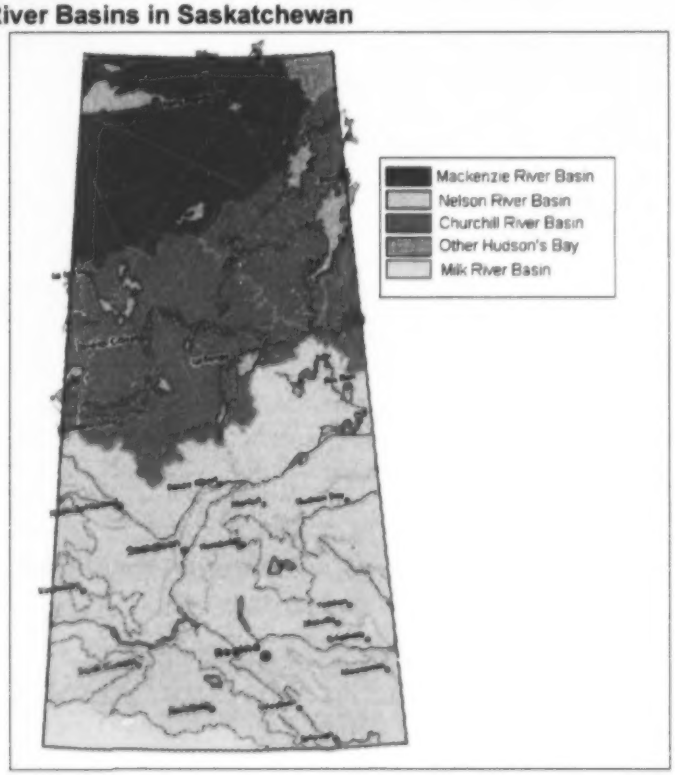
5.4 SASKATCHEWAN

Saskatchewan straddles three continental basins. Lands in the extreme south of the province drain south into the Mississippi drainage and then into the Gulf of Mexico. Waters in the northwest corner of the province flow west into Great Slave Lake and the Mackenzie River, and eventually into the Arctic Ocean. As shown in Figure 6, the majority of Saskatchewan is situated in the Hudson Bay drainage, mainly through either the Nelson or Churchill River systems, with a small portion of the northeast part of the province draining into Hudson Bay through the Northwest Territories.

Table 9: Major River Basins in Saskatchewan

Continental Basin	Major Drainage Area (WSC Number)	Major River Basins
Lands Draining into the Arctic Ocean	Great Slave Lake (07)	
Lands Draining into the Gulf of Mexico	Mississippi (11)	Milk River
Lands Draining into Hudson Bay	Nelson River (05)	
	Western and Northern Hudson Bay (06)	Churchill River Basin Other Hudson Bay

Figure 6: Major River Basins in Saskatchewan



5.4.1 Inter-Basin Transfers

In Saskatchewan, the Saskatchewan Watershed Authority is prohibited from issuing a licence or approval to construct or operate work that would allow water to be transferred out of a watershed or to issue a licence or approval to transfer water out of a watershed. However, this does not apply to water that is transferred between watersheds to portions of watersheds within Saskatchewan. For example, water from the South Saskatchewan River Basin is currently transferred into the Qu'Appelle River. Thus, the legislation would appear to only apply to proposals to export water outside the province. There is no definition of watershed in the legislation or regulations.

Diversions from one basin to another have been allowed to alleviate shortages and for a variety of purposes. Proposals for new transfers would require a licence and there would be public notification as part of the licensing process. According to the Saskatchewan Water Management Framework, inter-basin diversions should only be considered where a surplus supply of water exists, where the net benefits to be derived are greater in the receiving basin than in the donor basin, and where other alternatives are not feasible. Evaluations of applications for transfers would include an examination of the potential for inter-basin transfer of biota and suitable mitigation, since connecting two formerly separate watersheds could allow the introduction of parasites, new fish species and other organisms into new ecosystems.

5.4.2 Intra-Basin Transfers

Saskatchewan legislation also does not have any provisions that specifically prohibit inter-basin transfers. A project that diverts water from one-sub-basin to another would be required to submit an application for a water licence and would be evaluated using the same criteria as for any other licences, including inter-basin transfers.

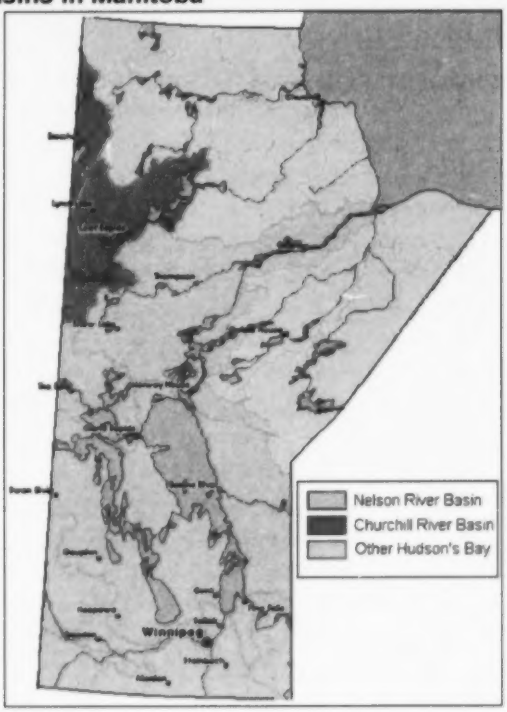
5.5 MANITOBA

All of Manitoba drains into Hudson Bay. Figure 7 shows that parts of three distinct major drainage areas are situated in Manitoba, but all drain directly or indirectly into Hudson Bay.

Table 10: Major River Basins in Manitoba

Continental Basin	Major Drainage Area (WSC Number)	Major River Basins
Lands Draining into Hudson Bay	Southwestern Hudson Bay (04)	
	Nelson River (05)	
	Western and Northern Hudson Bay (06)	

Figure 7: Major River Basins in Manitoba



5.5.1 Inter-Basin Transfers

The Manitoba legislation prohibits removal of water from a water basin, which is defined to mean the Manitoba portion of the Hudson Bay drainage, or from sub-water basins, which are to be defined in regulations that have not yet been developed. According to current water policies, transfers among basins within the Hudson Bay drainage shall be minimized and only considered after a complete assessment of the environmental, social and economic impacts of the donor and receiving basins.

Manitoba has a number of existing inter-basin transfer projects, such as the Churchill/Nelson hydroelectric project, although this would technically be considered an intra-basin transfer as both basins are located within the Hudson Bay drainage. There are also two diversions of water from Ontario to Manitoba: the Lake St. Joseph hydroelectric project and the diversion from Shoal Lake to the Red River via the City of Winnipeg Aqueduct for municipal purposes.

Applications for additional water transfer projects could still be accepted as long as there are social and economic benefits to Manitobans. It is expected that such applications would trigger an assessment and hearing under the *Environment Act* and, if approved, there would be terms and conditions related to maximum and minimum flows and minimum levels in storage reservoirs.

5.5.2 Intra-Basin Transfers

Although Manitoba prohibits the removal of water from sub-water basin, with sub-water basin to be defined in regulations, there are, as yet, no regulations. This means that, until such time as the regulation is approved by the legislature, there is no prohibition on transfers between sub-basins.

Any request for an intra-basin transfer would require a licence and would be subject to the same licensing provisions and process as any other application. It is expected that such applications would trigger an assessment and hearing under the *Environment Act* and, if approved, licenses would likely have terms and conditions related to protecting instream flows and respecting allocations to other licensed water users.

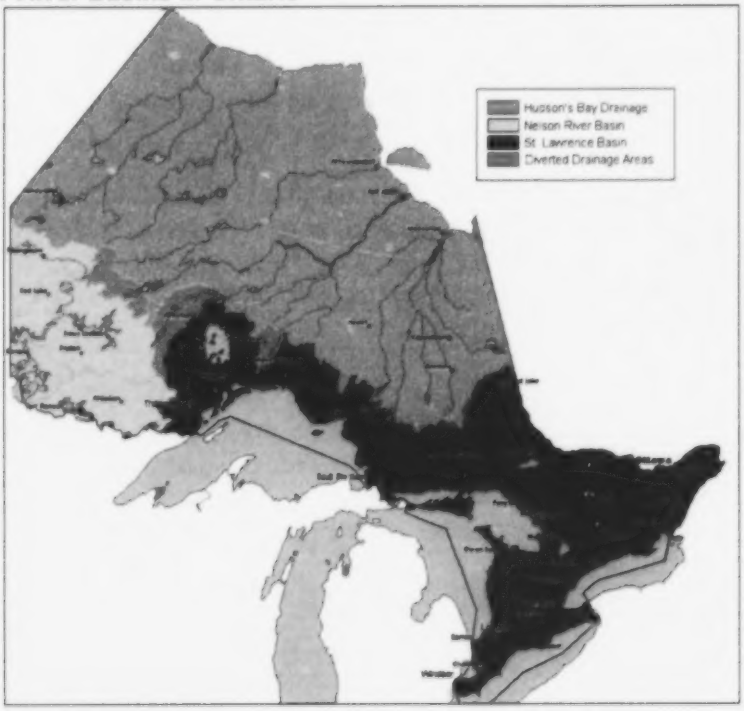
5.6 ONTARIO

Ontario straddles two continental basins. Most of western and northern Ontario drains into Hudson Bay either directly, or through the Nelson River basin (see Figure 8). Southern Ontario drains into the Great-Lakes – St. Lawrence River system. The Great Lakes – St. Lawrence system has been further subdivided into five watersheds.

Table 11: Major River Basins and Watersheds in Ontario

Continental Basin	Major Drainage Area (WSC Number)	Watersheds
Lands Draining into the Atlantic Ocean	St. Lawrence	Lake Superior Lake Huron, Lake Erie Lake Ontario St. Lawrence
Lands Draining into Hudson Bay	Southwestern Hudson Bay (04)	
	Nelson River (05)	

Figure 8: Major River Basins in Ontario



5.6.1 Inter-Basin Transfers

Ontario legislation prohibits people from using water by taking it out of a water basin. Projects that commenced prior to January 1, 1998 are exempted from this prohibition as long as the amount of water used does not exceed the maximum use for the periods from 1960 through 1997. For purposes of this provision, Ontario is divided into three water basins:

- Great Lakes – St. Lawrence region
- The Nelson Basin
- The Hudson Bay Basin

These provisions were initially introduced as regulations in 1998 but are slated to become specific provisions in the *Ontario Water Resources Act* once the revised *Act* is proclaimed.

As noted earlier, the *International Boundary Waters Treaty Act* prohibits bulk exports of water out of the Great Lakes – St. Lawrence Basin.

The Ontario legislation prohibits transfers between the Nelson and Hudson Bay basins, both of which drain into Hudson Bay, and there is no threshold under which transfers are acceptable. Some legislative changes that would further restrict transfers between selected major watersheds have been proposed and are awaiting proclamation. These changes have been developed as Ontario's response to the Great Lakes – St. Lawrence Basin Sustainable Water Resources Agreement which was signed by Ontario, Quebec, Illinois, Indiana, Michigan, Minnesota, New York, Pennsylvania, and Wisconsin in 2005. The proposed changes identify

five Great Lakes basins (the Lake Superior, Lake Huron, Lake Erie, Lake Ontario, and St. Lawrence watersheds – see Figure 9) and water transfers between these watersheds would be prohibited, with some exceptions.

Figure 9: Watersheds Within the Great Lakes – St. Lawrence Basin

Transfers between Great Lakes watersheds may be allowed for municipal purposes as long as the transfer amount is less than 19 million litres per day (6,935 dam^3 per year), the water is to be used to serve a major residential development, conservation is not an option, there are no feasible alternatives, notice is given to other signatories of the Agreement, water is returned to the same source watershed, the amount is reasonable, there are no significant adverse impacts on water quality or quantity, appropriate water conservation measures are employed, and is consistent with existing treaties and agreements related to boundary waters. Transfers for other purposes are allowed provided that the amount is less than 379,000 litres per day (138 dam^3 per year).

Persons proposing a transfer between Great Lakes watersheds must apply for a permit to take water, and follow the same application process. In addition, notice of applications for the transfers must be given to all signatories of the Agreement and any of them can request a hearing by a tribunal which can confirm, alter, or revoke a decision to issue the permit. Permits can specify the amount to be transferred; the manner, quality, minimum amount and location of return flow; monitoring and reporting of the amounts transferred and returned, the rate of transfer, the use and conservation of transferred water, and the effects of transfers on quality

Figure 8: Major River Basins in Ontario

5.6.1 Inter-Basin Transfers

Ontario legislation prohibits people from using water by taking it out of a water basin. Projects that commenced prior to January 1, 1998 are exempted from this prohibition as long as the amount of water used does not exceed the maximum use for the periods from 1960 through 1997. For purposes of this provision, Ontario is divided into three water basins:

- Great Lakes – St. Lawrence region
- The Nelson Basin
- The Hudson Bay Basin

These provisions were initially introduced as regulations in 1998 but are slated to become specific provisions in the *Ontario Water Resources Act* once the revised *Act* is proclaimed.

As noted earlier, the *International Boundary Waters Treaty Act* prohibits bulk exports of water out of the Great Lakes – St. Lawrence Basin.

The Ontario legislation prohibits transfers between the Nelson and Hudson Bay basins, both of which drain into Hudson Bay, and there is no threshold under which transfers are acceptable. Some legislative changes that would further restrict transfers between selected major watersheds have been proposed and are awaiting proclamation. These changes have been developed as Ontario's response to the Great Lakes – St. Lawrence Basin Sustainable Water Resources Agreement which was signed by Ontario, Quebec, Illinois, Indiana, Michigan, Minnesota, New York, Pennsylvania, and Wisconsin in 2005. The proposed changes identify

five Great Lakes basins (the Lake Superior, Lake Huron, Lake Erie, Lake Ontario, and St. Lawrence watersheds – see Figure 9) and water transfers between these watersheds would be prohibited, with some exceptions.

Figure 9: Watersheds Within the Great Lakes – St. Lawrence Basin

Transfers between Great Lakes watersheds may be allowed for municipal purposes as long as the transfer amount is less than 19 million litres per day (6,935 dam^3 per year), the water is to be used to serve a major residential development, conservation is not an option, there are no feasible alternatives, notice is given to other signatories of the Agreement, water is returned to the same source watershed, the amount is reasonable, there are no significant adverse impacts on water quality or quantity, appropriate water conservation measures are employed, and is consistent with existing treaties and agreements related to boundary waters. Transfers for other purposes are allowed provided that the amount is less than 379,000 litres per day (138 dam^3 per year).

Persons proposing a transfer between Great Lakes watersheds must apply for a permit to take water, and follow the same application process. In addition, notice of applications for the transfers must be given to all signatories of the Agreement and any of them can request a hearing by a tribunal which can confirm, alter, or revoke a decision to issue the permit. Permits can specify the amount to be transferred; the manner, quality, minimum amount and location of return flow; monitoring and reporting of the amounts transferred and returned, the rate of transfer, the use and conservation of transferred water, and the effects of transfers on quality

and quantity; and measures employed to promote efficient water use and reduce water loss. Permittees may also be asked to conduct water audits and submit water conservation plans.

5.6.2 Intra-Basin Transfers

The Ontario legislation does not expressly prohibit the transfer of water between sub-basins within a Great Lake watershed, nor does it prohibit transfers between sub-basins with either the Nelson or Hudson Bay basins.

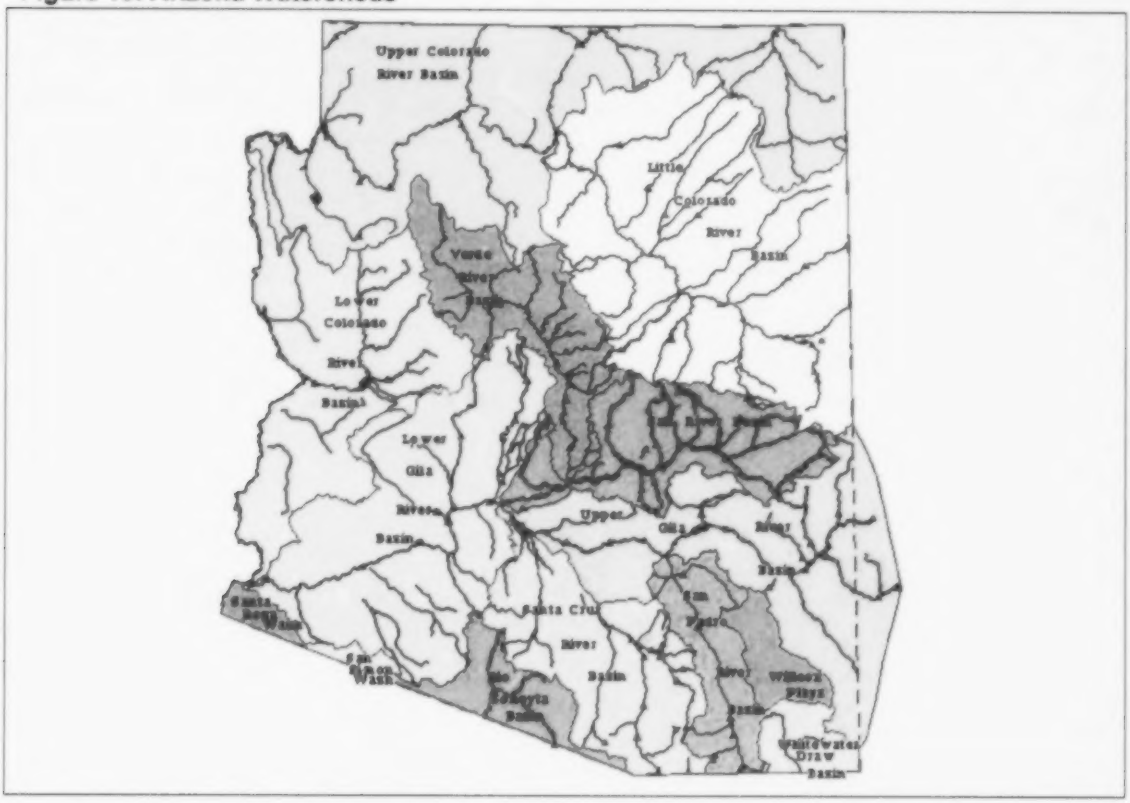
5.7 ARIZONA

All of Arizona is situated in the Colorado River Basin which drains into the Gulf of California and then into the Pacific Ocean. There are 14 watersheds in Arizona (see Figure 10) and these are all mainly located in the Lower Colorado hydrologic unit. There is no definition of major basin in the legislation. The US Geological Survey identifies 13 surface water basins and 10 watersheds, some of which have been combined or split to facilitate USGS administration and monitoring.

Table 12: Arizona Watersheds

Continental Basin	Regional Hydrologic Unit	Watershed
Lands Draining into Gulf of California	Upper Colorado	Upper Colorado River Basin
	Lower Colorado	Upper Colorado River Basin
		Little Colorado River Basin
		Lower Colorado River Basin
		Verde River Basin
		Salt River Basin
		Upper Gila River Basin
		Lower Gila River Basin
		Santa Cruz River Basin
		San Pedro River Basin
		Rio Sonoyta River Basin
		Whitewater Draw Basin
		Willcox Playa
		San Simon Wash
		Santa Rosa Wash

Figure 10: Arizona Watersheds



5.7.1 Inter-Basin Transfers

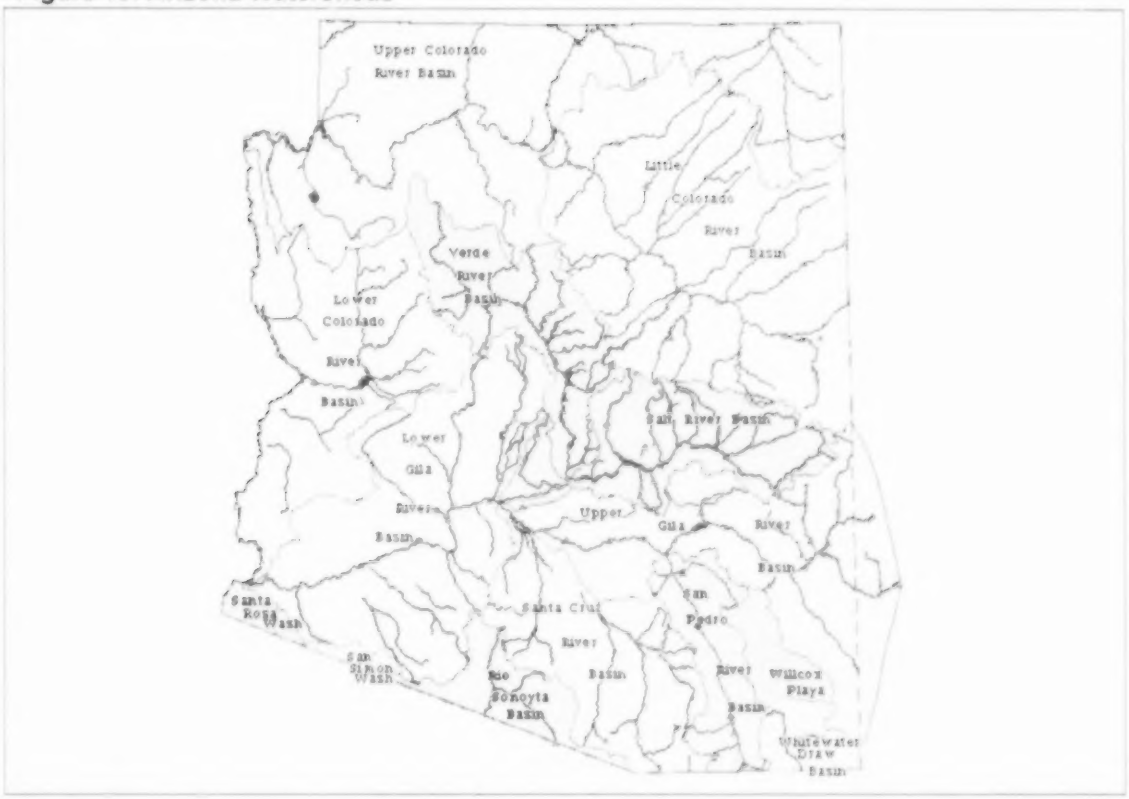
There appears to be no limitations on appropriating water from one major basin to another within Arizona as a long as the transfer does not harm or diminish the water available to other appropriators, a proposed transfer from a water users association (including irrigation district) has the consent of the association, and, in the case of transfers to an Indian Tribe or other specified Indian groups, does not exceed 3,600 acre-feet (4,439 dam^3) and is subject to judicial review. The process for receiving a permit for an inter-basin transfer is the same as for any permit. Between 1987 and 2004, about 300 such permits were issued.

Proposed out-of-state transfers have been disallowed on the basis that they would lessen Arizona's entitlement under the Colorado River Compact and that any such diminishment must be agreed to by all the states involved.

5.7.2 Intra-Basin Transfers

Transfers of water from one sub-basin to another are allowed, subject to the same conditions as any other water appropriation permit. There are no definitions of sub-basins.

Figure 10: Arizona Watersheds



5.7.1 Inter-Basin Transfers

There appears to be no limitations on appropriating water from one major basin to another within Arizona as a long as the transfer does not harm or diminish the water available to other appropriators, a proposed transfer from a water users association (including irrigation district) has the consent of the association, and, in the case of transfers to an Indian Tribe or other specified Indian groups, does not exceed 3,600 acre-feet (4,439 dam^3) and is subject to judicial review. The process for receiving a permit for an inter-basin transfer is the same as for any permit. Between 1987 and 2004, about 300 such permits were issued.

Proposed out-of-state transfers have been disallowed on the basis that they would lessen Arizona's entitlement under the Colorado River Compact and that any such diminishment must be agreed to by all the states involved.

5.7.2 Intra-Basin Transfers

Transfers of water from one sub-basin to another are allowed, subject to the same conditions as any other water appropriation permit. There are no definitions of sub-basins.

5.8 CALIFORNIA

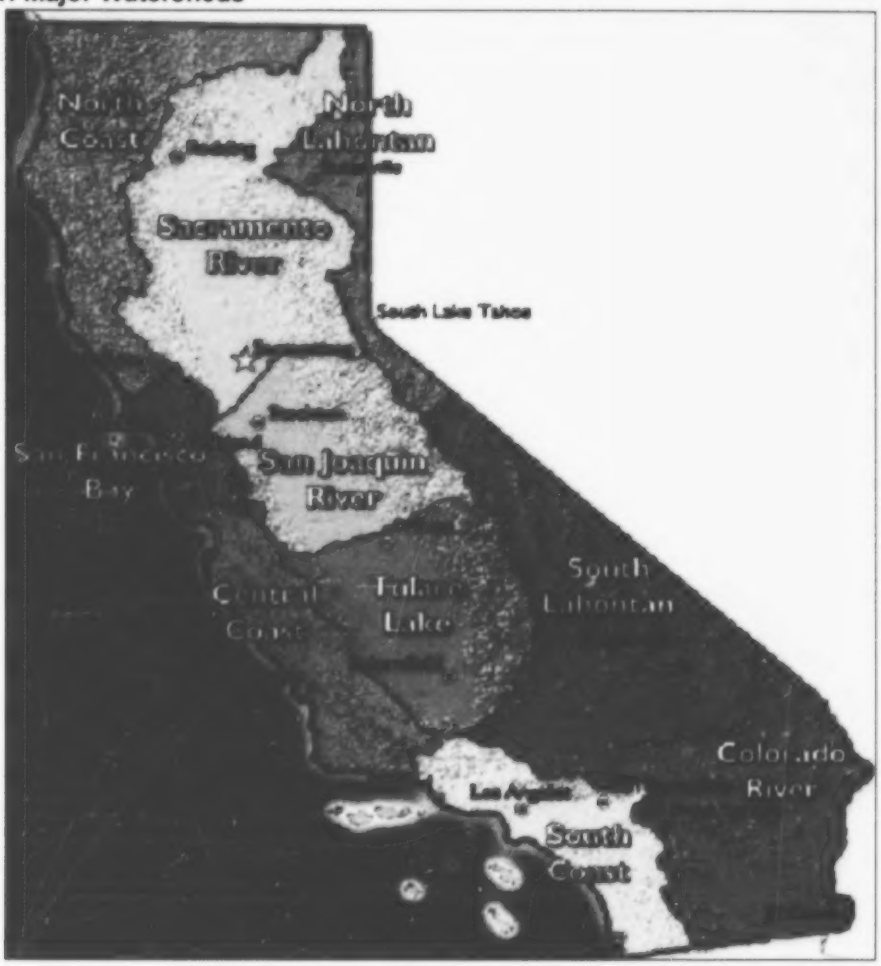
In California, the Interagency Watershed Mapping Committee (IWMC) is responsible for all interagency watershed mapping. California has 10 identified hydrologic regions that include groundwater systems and these watersheds are shown in Figure 11. It is noteworthy that these watershed boundaries do not always coincide with the natural hydrologic unit boundaries used by the US Geological Survey. A comparison of maps indicates that aqueducts constructed to move water from one hydrologic unit to another, have effectively been recognized as changing the watershed boundaries. For example, although only a small portion of California along its south east border is actually located in the Colorado hydrologic unit, the Colorado aqueduct provides water to a much larger area that is now defined as the Colorado watershed.

Nearly all of all 10 watersheds drain directly into the Pacific Ocean. However, parts of the North and South Lahontan watersheds actually east drain into the Great Basin hydrologic unit which is considered a non-draining basin, in that the water does not end up in an ocean (a "closed" basin).

Table 13: Major Watersheds in California

Continental Basin	Regional Hydrologic Unit	Major Watershed
Lands Draining into the Pacific Ocean	California	North Coast Sacramento River San Joaquin River Tulare Lake San Francisco Bay Central Coast North Lahontan South Lahontan Colorado River South Coast
Lands Draining into the Gulf of California	Lower Colorado	Parts of Colorado River watershed
Non-draining Basin	Great Basin	Parts of North and South Lahontan

Figure 11: Major Watersheds



5.8.1 Inter-Basin Transfers

In general, California allows inter-basin transfers except where prohibited or limited by statute. In the case of inter-state streams, an appropriation in California for use in another state is only possible if the state receiving the water has legislation that allows water to be appropriated and diverted for beneficial use in California. Transfers of water out of the California Wild Scenic River System to other major hydrologic basins are prohibited, unless authorized by statute. State policy actually facilitates the voluntary transfer of water rights where consistent with the public welfare of the place of export and the place of import. It is also in the public interest to conserve water by assisting in voluntary transfers to allow more intensive use of developed water resources.

Figure 11: Major Watersheds

5.8.1 Inter-Basin Transfers

In general, California allows inter-basin transfers except where prohibited or limited by statute. In the case of inter-state streams, an appropriation in California for use in another state is only possible if the state receiving the water has legislation that allows water to be appropriated and diverted for beneficial use in California. Transfers of water out of the California Wild Scenic River System to other major hydrologic basins are prohibited, unless authorized by statute. State policy actually facilitates the voluntary transfer of water rights where consistent with the public welfare of the place of export and the place of import. It is also in the public interest to conserve water by assisting in voluntary transfers to allow more intensive use of developed water resources.

A permit and licence would be required to appropriate water from one basin for use in another, either by way of an application for unappropriated water or through transfer of an existing appropriation. Approval would employ the same tests as for any permit.

5.8.2 Intra-Basin Transfers

California legislation does not prohibit intra-basin transfers. Transfers are actually considered to be in the public interest where voluntary transfers allow more intensive use of developed water resources. Persons proposing intra-basin transfers would have to either acquire a new permit and licence from the state or acquire an existing appropriation.

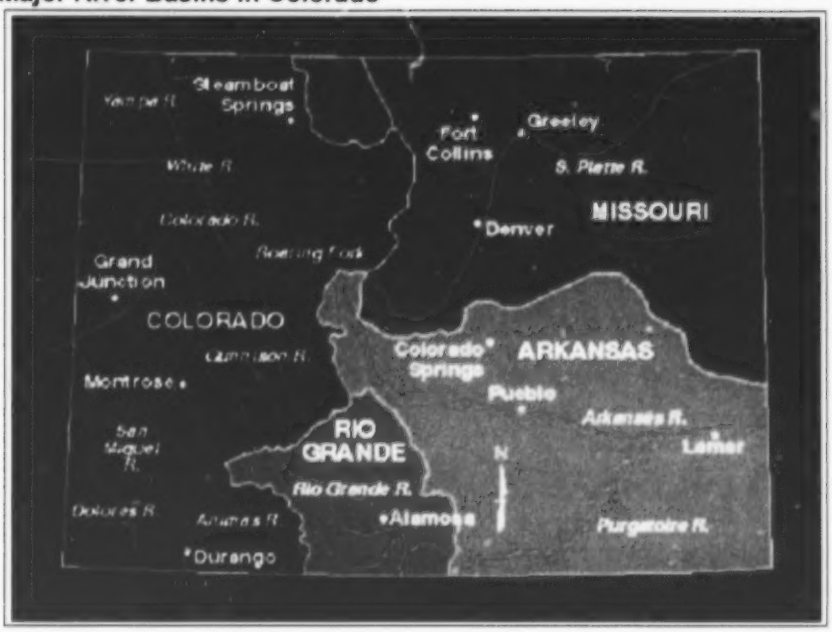
5.9 COLORADO

There are four major river basins in Colorado (See Figure 12). The western portion of the state drains west into the Colorado River which eventually drains into the Gulf of California and the Pacific Ocean. The other three major river basins drain into the Gulf of Mexico. Two of these major river basins, the Arkansas and the Missouri, drain east into the Mississippi, while the Rio Grande River drains directly into the Gulf of Mexico.

Table 14: Major River Basins in Colorado

Continental Basin	Regional Hydrologic Unit	Major River Basins
Lands Draining into the Gulf of Mexico	Missouri	Missouri
	Arkansas – White - Red	Arkansas
	Rio Grande	Rio Grande
Lands Draining into the Gulf of California	Upper Colorado	Colorado River Basin

Figure 12: Major River Basins in Colorado



5.9.1 Inter-Basin Transfers

All major river basins in Colorado flow into other states and it is unlawful to transfer water out of the state without obtaining the required approvals. Colorado is party to nine inter-state compacts, two U.S. Supreme Court decrees, and one international treaty. Inter-state transfers are prohibited unless approved by a state engineer, ground water commission, or water judge. Applications for out of state transfers are evaluated in terms of whether the proposed transfer would impair the ability of Colorado to comply with its obligations under any judicial decree or interstate compact which apportions water between Colorado and any other state or states, is not inconsistent with the reasonable conservation of the water resources of this state; and will not deprive the citizens of this state of the beneficial use of waters apportioned to Colorado by interstate compact or judicial decree.

Transfers among major basins are allowed and, in practice, are an essential component of a prior appropriation system that allows users to obtain water from available water sources. To facilitate inter-basin water management Colorado legislation defines eight water basins and one demographically unique sub-region, and has created nine permanent basin roundtables. Water basins are defined in terms of one or more water division areas and/or water management districts. Water division areas consist of lands within defined drainage basin areas of specific rivers and their tributaries as defined by the *Water Right Determination and Administration Act* of 1969. A collaborative inter-basin compact committee, consisting of two representatives from each basin roundtable, has been established to facilitate negotiated statewide water management and supply solutions. Inter-basin transfers are negotiated agreements that are voluntary and collaborative. While proponents are not compelled to use the committee or

forum, any basin/roundtable whose waters are affected by a compact must provide affirmative support to the agreement in order for it to be ratified. There are at least 24 trans-mountain diversions between basins.

5.9.2 Intra-Basin Transfers

Water transfers within major basins are not prohibited and numerous mechanisms have been established to facilitate moving water from source to demand:

- The legislation allows water to be transferred by way of a change in the type, place, or point of diversion of water rights by adjudication in the water courts.
- A temporary/interruptible water supply agreement may in some circumstances be available without a permanent change in water rights with approval of the State Engineer.
- Agricultural irrigation water rights may be loaned to another agricultural user within the same stream system or to the Conservation Board for instream flows for a maximum period of no longer than 180 days in any calendar year.
- Water conservation districts which hold water rights may enter into cooperative agreements with other state political subdivisions for the lease or exchange of water within or outside of district
- Water transfers may be achieved within the Arkansas River basin by way of a water bank pilot project.

Transfers might occur by changes in water rights as determined by the water courts, by approval of the state engineer, by mutual agreement, or by way of the Arkansas water bank pilot project.

Loans must be approved by the state engineer who must determine that the loan will not impair existing rights. The engineer must also review evidence regarding the nature of the water right to be transferred, provide written notice, provide an opportunity for others with water rights to comment, hold hearings if warranted, and provide all parties with notice of the decision. Decisions of the engineer can be appealed to the division water judge.

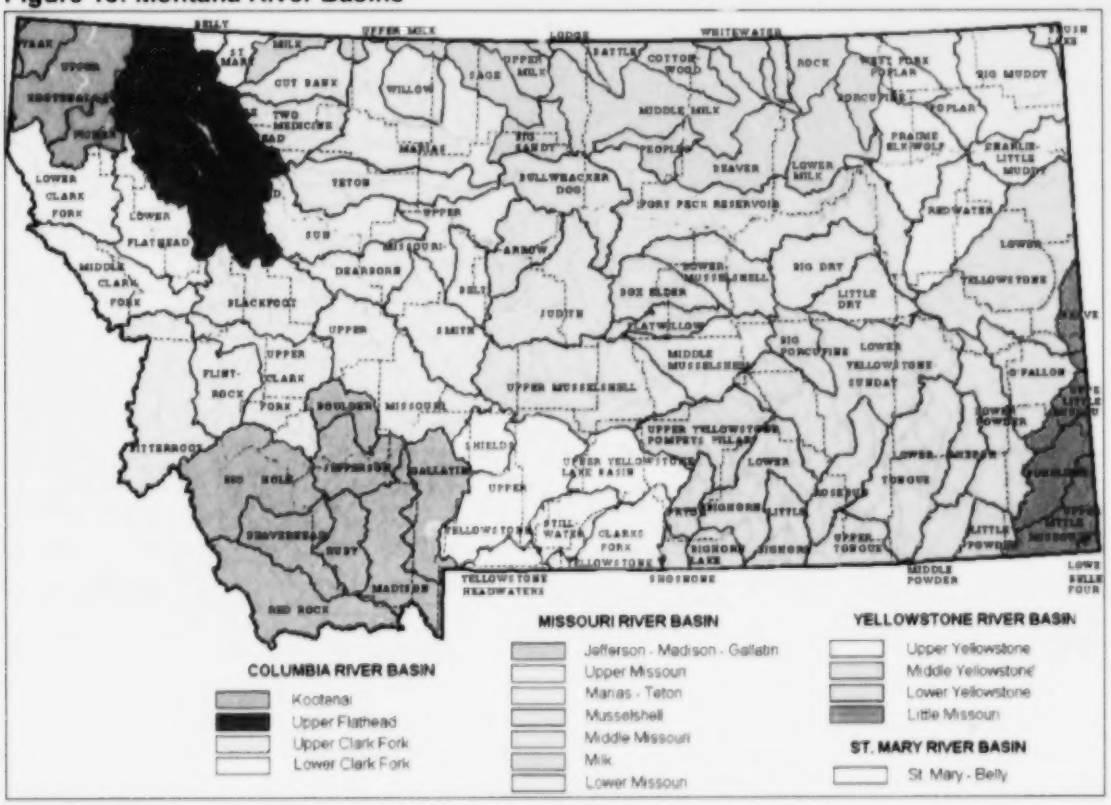
5.10 MONTANA

There are three continental water basins in Montana: the Columbia, Hudson Bay drainage, and Missouri drainage. The Hudson Bay drainage is represented by the St. Mary Basin. There are two sub-basins for the Columbia: Clark Fork and Kootenai. The Missouri includes the Yellowstone, Little Missouri and Missouri Basin. The state recognizes four main geographical drainages for administrative purposes; the Lower Missouri, the Upper Missouri, the Yellowstone River and the Clark Fork River. Finally, 85 basins are identified in Montana for the basis of water rights adjudication by the Water Court. Figure 13 shows the major basins and smaller basins in Montana. It should be noted that Montana does not identify the Belly and St. Mary river basins, which drain into Hudson Bay, as a distinct geographical drainage.

Table 15: Major River Basins in Montana

Continental Basin	Regional Hydrologic Unit	Major River Basins
Lands Draining into the Pacific Ocean	Pacific Northwest	Clark Fork/ Kootenai
Lands Draining into the Gulf of Mexico	Missouri	Yellowstone Little Missouri Missouri
Lands Draining into Hudson Bay		St. Mary Basin

Figure 13: Montana River Basins



5.10.1 Inter-Basin Transfers

As a prior appropriation state, there have long been both intra- and inter -basin transfers in Montana. Historically, individuals were able to acquire water rights and could transfer water from one basin or sub-basin to another, by actually putting water to beneficial use and without having to register this use. This has resulted in some uncertainty about the relative priority among water claims. The priority of claims to water rights, including those that transfer water

Table 15: Major River Basins in Montana

Continental Basin	Regional Hydrologic Unit	Major River Basins
Lands Draining into the Pacific Ocean	Pacific Northwest	Clark Fork/ Kootenai
Lands Draining into the Gulf of Mexico	Missouri	Yellowstone Little Missouri Missouri
Lands Draining into Hudson Bay		St. Mary Basin

Figure 13: Montana River Basins

5.10.1 Inter-Basin Transfers

As a prior appropriation state, there have long been both intra- and inter -basin transfers in Montana. Historically, individuals were able to acquire water rights and could transfer water from one basin or sub-basin to another, by actually putting water to beneficial use and without having to register this use. This has resulted in some uncertainty about the relative priority among water claims. The priority of claims to water rights, including those that transfer water

between or within basins, are currently the subject of review and confirmation as part of the general adjudication procedure for all older water rights in Montana through the Water Court.

An example of an early basin transfer in Montana is the St. Mary/Milk basin transfer which diverts water by way of the US St. Mary canal from the St. Mary River, which drains to Hudson Bay, to the Milk River, which drains to the Gulf of Mexico. This transfer and the subsequent conveyance of St. Mary waters through the Milk River in Canada were also approved by Article VI of the Boundary Waters Treaty and the International Joint Commission's 1921 Order. Originally built in 1915-1916, the St. Mary Canal had a design capacity of 850 cubic feet per second. The project was originally built for irrigation purposes. The amount and timing of water diversions during any period are limited to the lesser of the US St. Mary Canal capacity or the US St. Mary River entitlements established under the 1921 Order.

New transfers are subject to some restrictions, however. A general restriction is that after July 1 1973, only the Department may hold a permit for a transfer out of a major basin for amounts in excess of 4,000 acre-feet per year (4,932 dam^3) or 5.5 cubic feet per second. In addition, special rules apply to out-of-state transportation and use of water.

The Yellowstone River Compact between Montana, North Dakota and Wyoming provides that no water shall be diverted from the Yellowstone Basin without the unanimous consent of all the signatory states. Future transfers involving federal money or programs would likely trigger the *National Environmental Policy Act*.

5.10.2 Intra-Basin Transfers

Applications for sub-basin transfers are treated the same as applications for inter-basin transfers, except that the more recent (1973) restrictions imposed on transfers outside of major basins would not apply. Thus, Montana law would continue to treat an application for a sub-basin transfer in much the same way as any other application for a permit. There are many older water rights in Montana that have a point of diversion in one of the 85 recognized basins and a place of use in another basin. For example, a water court temporary preliminary decree in relation to Basin 43Q refers to 23 inter-basin transfer claims out of total of 2,743 claims subject to adjudication in the basin.

5.11 NORTH CAROLINA

From a water planning perspective, North Carolina is divided into 18 river basins. These 18 basins are shown in Figure 14. Twelve of these basins drain east and/or south directly into the Atlantic Ocean. The other five basins drain west out of North Carolina and directly into the Mississippi River and eventually into the Gulf of Mexico. One of these five is situated in the Ohio hydrologic unit while the other four are in the Tennessee hydrologic unit.

Table 16: River Basins in North Carolina

Continental Basin	Regional Hydrologic Unit	River Basins
Lands Draining into the Atlantic Ocean	South Atlantic - Gulf	Aberlemarle Sound Broad Cape Fear Catawba Chowan Lumber Neuse Pasquotank Roanoke Savannah Tar-Pamlico White Oak Yadkin-PeeDee
Lands Draining into the Gulf of Mexico	Ohio	New River
	Tennessee	Watauga French Broad Little Tennessee Hiwassee

Figure 14: River Basins in North Carolina

5.11.1 Inter-Basin Transfers

The *Regulation of Surface Water Transfers Act* came into effect in 1994. Eighteen major basins are defined in the legislation and transfers between basins and sub-basins are allowed for any purpose, subject to regulatory approval. Small transfers (100,000 gallons/day or 138 dam^3 per year) need to be registered with Division of Water Resources but do not require an approval. However, registrations are not required for activities directly related or incidental to agriculture, livestock and ornamental and flowering plants where transfers are less than 1 million gallons per day (1,381 dam^3 per year). Any transfer of 2 million gallons or more per day (2,632 dam^3 per year), regardless of purpose, requires an approval (certificate for transfer) from the

Table 16: River Basins in North Carolina

Continental Basin	Regional Hydrologic Unit	River Basins
Lands Draining into the Atlantic Ocean	South Atlantic - Gulf	Aberlemarle Sound Broad Cape Fear Catawba Chowan Lumber Neuse Pasquotank Roanoke Savannah Tar-Pamlico White Oak Yadkin-PeeDee
Lands Draining into the Gulf of Mexico	Ohio	New River
	Tennessee	Watauga French Broad Little Tennessee Hiwassee

Figure 14: River Basins in North Carolina

5.11.1 Inter-Basin Transfers

The *Regulation of Surface Water Transfers Act* came into effect in 1994. Eighteen major basins are defined in the legislation and transfers between basins and sub-basins are allowed for any purpose, subject to regulatory approval. Small transfers (100,000 gallons/day or 138 dam^3 per year) need to be registered with Division of Water Resources but do not require an approval. However, registrations are not required for activities directly related or incidental to agriculture, livestock and ornamental and flowering plants where transfers are less than 1 million gallons per day (1,381 dam^3 per year). Any transfer of 2 million gallons or more per day (2,632 dam^3 per year), regardless of purpose, requires an approval (certificate for transfer) from the

Environmental Management Commission. In all cases, the amount of transfer is determined as the amount of water moved from the source basin to the receiving basin, less the amount of water returned to the source basin.

The following are not considered transfers:

- Discharge of water upstream or downstream from the point where it was withdrawn.
- Discharge point is situated upstream of withdrawal point such that the water discharges will naturally flow past the withdrawal point
- Discharge point is situated downstream of the withdrawal point such that the water flowing past the withdrawal point will naturally flow past the discharge point.

Applications for proposed transfers require extensive public notice and public hearings on the proposed transfer are required. Factors considered when evaluating proposals include:

- The necessity, reasonableness, and beneficial effects of the transfer and proposed uses.
- The present and reasonably foreseeable future detrimental effects on the source river basin including public, industrial, agricultural water supply needs, waste water assimilation, water quality, fish and wildlife habitat, hydro power generation, navigation and recreation. Municipal water needs are to be evaluated within the context of local water supply plans.
- The cumulative effects on the source river basin.
- The detrimental effects on the receiving basin including effects on water quality, wastewater assimilation, fish and wildlife habitat, navigation, recreation and flooding.
- Reasonable alternatives to the transfer, including their costs and environmental impacts.
- Consistent with any other applicable statutory requirements.

The overarching test is whether the benefits of outweigh the detriments of the proposed transfer and whether the detriments have been or will be mitigated to a reasonable degree.

The Commission may grant the certificate in whole or in part with any conditions attached for the fulfilling of the statutory requirements. Conditions can include:

- Mitigation measures to minimize detrimental effects.
- Measures to protect the availability of water in the source river basin during a drought through drought management plan or other emergency conditions.
- Maximum amount of water that may be transferred.

Applicants may apply to modify the permit to increase the authorized transfer amount within the term of the permit.

Permits are issued for a renewable term of not more than five years. Under emergency conditions, the Commissioner may waive usual permit requirements for up to six months or modify or revoke and reissue any inter-basin transfer permits.

Four certificates totaling 97.5 million gallons per day (134,714 dam^3 per year) have been issued. Three applications are currently being processed.

5.11.2 Intra-Basin Transfers

The *Regulation of Surface Water Transfers Act* also allows the transfer of water between sub-basins, with the same provisions as transfers between major basins. The regulation lists 38 specific sub-basins.

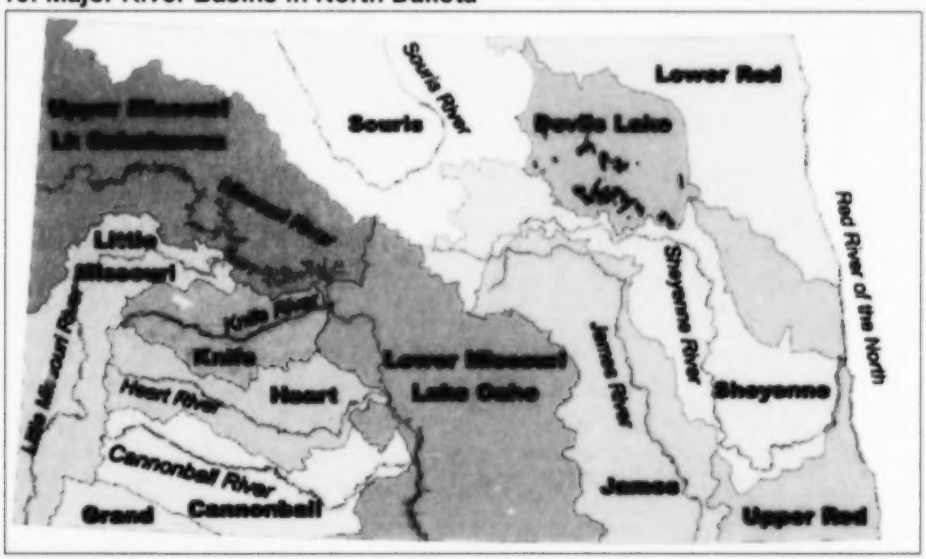
5.12 NORTH DAKOTA

The US Geological Service identifies 13 major river basins in North Dakota. These 13 basins are shown in Figure 15. Five of these major basins are situated in the Souris – Red – White hydrologic unit that drains north into Hudson Bay. The other eight basins are part of the Missouri hydrologic unit that drains south into the Gulf of Mexico.

Table 17: Major River Basins in North Dakota

Continental Basin	Regional Hydrologic Unit	Major River Basins
Lands Draining into the Gulf of Mexico	Missouri	James Lower Missouri/Lake Oahe Upper Missouri/Lake Sakakawea Cannonball Grand Heart Knife Little Missouri
Lands Draining into Hudson Bay	Souris – Red - White	Souris Sheyenne Devils Lake Upper Red Lower Red

Figure 15: Major River Basins in North Dakota



5.12.1 Inter-Basin Transfers

The Missouri River Basin is the main source of reliable and high quality water in North Dakota. Consequently, North Dakota legislation (e.g. NDCC, chapter 61-24, providing for the creation of the Garrison Diversion Conservancy District) and policy has long supported inter-basin transfer projects for a variety of beneficial purposes, including irrigation and municipal uses. Particularly important projects include the Garrison Diversion (only partially completed as a result of objections raised by the International Joint Commission based on biota transfer from the Missouri drainage to the Hudson Bay Drainage) and the Northwest Area Water Supply Project (currently under construction) which will provide water from Lake Sakakawea (created by the Garrison Dam) on the Missouri via pipeline (up to 2 million gallons a day for 63,000 persons [2,763 dam^3]) to a number of communities including Minot. Federal legislation plays a role in financially supporting basin transfers in North Dakota including the original Garrison Project legislation of 1944, the *Garrison Reformulation Act* of 1986 (responding to IJC concerns) and, most recently, the *Dakota Water Resources Act* of 2000.

Although, as noted above, both legislation and policy support the consideration of basin transfers there is no special legislation governing approval of basin transfer schemes. Hence, such a scheme would be subject to all of the rules that apply to any application for a water use permit. In addition, any major scheme would likely trigger a requirement for a federal environmental impact assessment under NEPA. Since basin transfers from the Missouri will likely effect a transfer into Hudson Bay drainage and thence into Canada via the Red River, it is also possible that such a project will trigger Canada to request a review by the International Joint Commission (as it did in the context of the Garrison Diversion). However, International Joint Commission involvement will only be triggered if both governments agree to refer the matter to the International Joint Commission and, as the Devils Lake scenario demonstrates (discussed in Section 5.12.2) , this does not always happen.

5.12.2 Intra-Basin Transfers

North Dakota's approach to intra-basin transfers is much the same as for inter- basin transfers. Applications for intra-basin transfers would be subject to review and approval in much the same way as any other applications for water use permits.

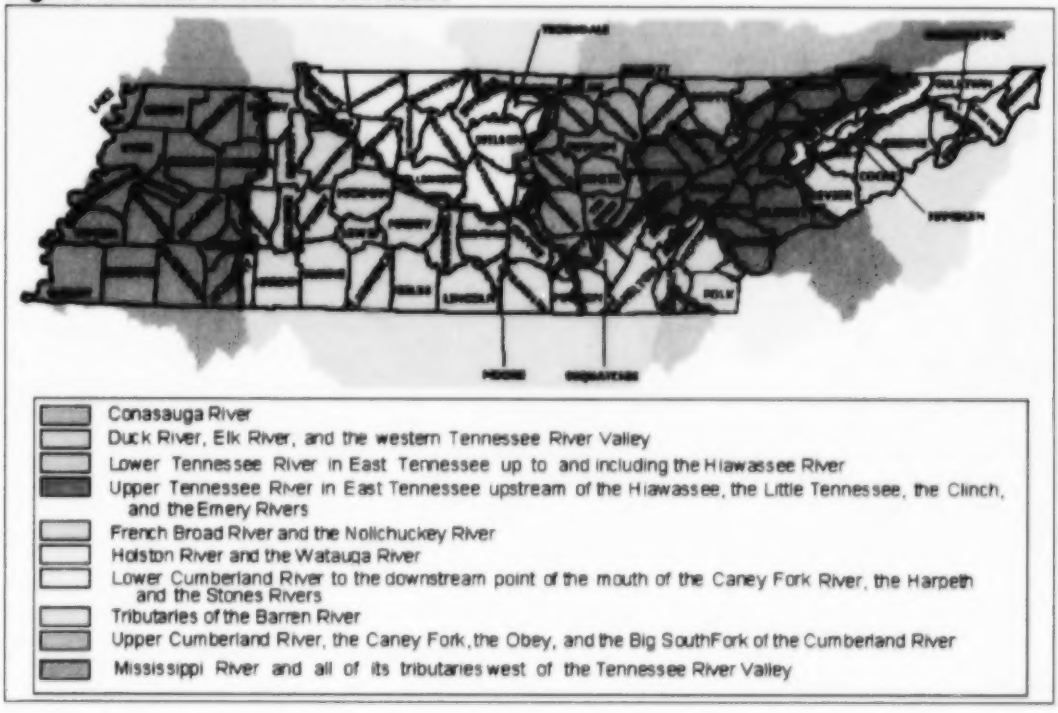
A particularly notorious intra-basin transfer is the Devils Lake outlet project. Devils Lake is a closed basin that, at least 1,000 years ago, used to drain into Hudson Bay. Rising water levels had led the North Dakota government to seek an outlet for the lake for many years. A number of options were considered including not only federally supported projects but also a stand-alone, state-funded project that was eventually implemented in 2006. This provides for an outlet from the lake to the Sheyenne River and thence into the Red River and in to Manitoba. Manitoba and Canada opposed this project and sought to have the matter referred to the IJC for further study, but the United States never agreed to initiate the Reference. The project is permitted under North Dakota law but does not require a water use permit since the State Engineer takes the view that lowering the level of the lake does not constitute a beneficial water use. The project does require a water discharge permit which regulates the volume of

discharge, the quality of the discharge and requires constant monitoring as a term of the approval.

5.13 TENNESSEE

Section 4 of Tennessee's Inter- Basin Water Transfer Act identifies 10 watersheds. One of these watersheds drains southeast directly into the Atlantic Ocean while the other nine drain out of the state and are parts of three hydrologic units that drain into the Gulf of Mexico. As summarized in Table 18 and Figure 16, five of the watersheds are in the Tennessee hydrologic unit, three are in the Ohio hydrologic unit, and one watershed is in the Lower Mississippi hydrologic unit.

Figure 16: Watersheds in Tennessee


Conasauga River
Duck River, Elk River, and the western Tennessee River Valley
Lower Tennessee River in East Tennessee up to and including the Hiawassee River
Upper Tennessee River in East Tennessee upstream of the Hiawassee, the Little Tennessee, the Clinch, and the Emery Rivers
French Broad River and the Nolichuckey River
Holston River and the Watauga River
Lower Cumberland River to the downstream point of the mouth of the Caney Fork River, the Harpeth and the Stones Rivers
Tributaries of the Barren River
Upper Cumberland River, the Caney Fork, the Obey, and the Big SouthFork of the Cumberland River
Mississippi River and all of its tributaries west of the Tennessee River Valley

discharge, the quality of the discharge and requires constant monitoring as a term of the approval.

5.13 TENNESSEE

Section 4 of Tennessee's Inter- Basin Water Transfer Act identifies 10 watersheds. One of these watersheds drains southeast directly into the Atlantic Ocean while the other nine drain out of the state and are parts of three hydrologic units that drain into the Gulf of Mexico. As summarized in Table 18 and Figure 16, five of the watersheds are in the Tennessee hydrologic unit, three are in the Ohio hydrologic unit, and one watershed is in the Lower Mississippi hydrologic unit.

Figure 16: Watersheds in Tennessee

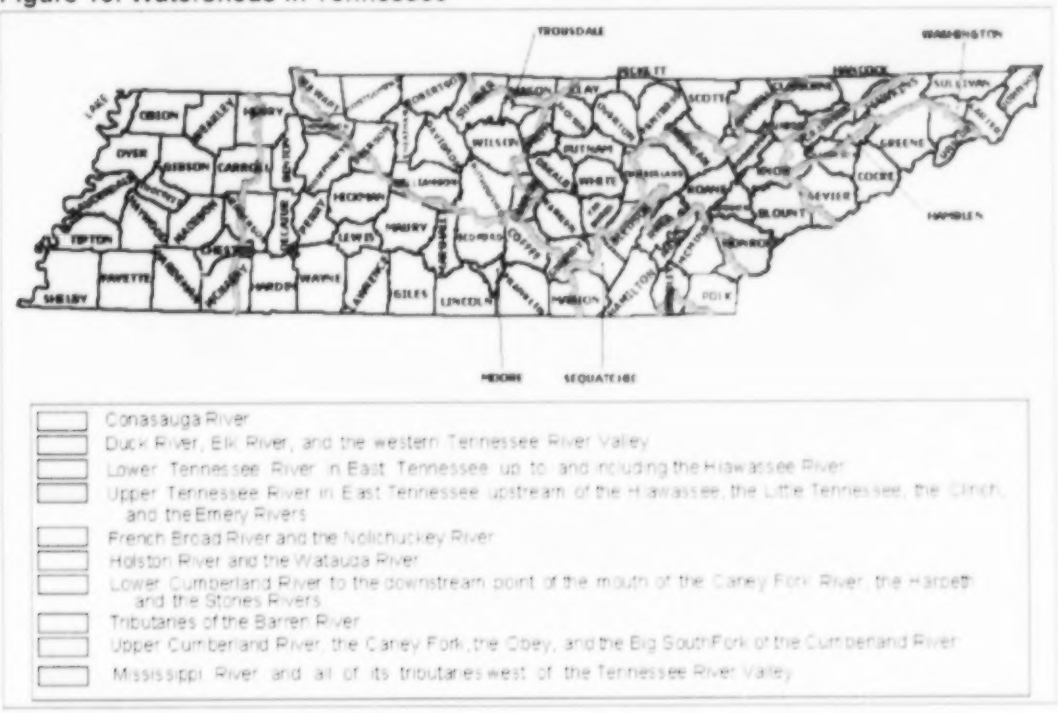

Conasauga River
Duck River, Elk River, and the western Tennessee River Valley
Lower Tennessee River in East Tennessee up to and including the Hiawassee River
Upper Tennessee River in East Tennessee upstream of the Hiawassee, the Little Tennessee, the Clinch, and the Emery Rivers
French Broad River and the Nolichuckey River
Holston River and the Watauga River
Lower Cumberland River to the downstream point of the mouth of the Caney Fork River, the Harpeth and the Stones Rivers
Tributaries of the Barren River
Upper Cumberland River, the Caney Fork, the Obey, and the Big South Fork of the Cumberland River
Mississippi River and all of its tributaries west of the Tennessee River Valley

Table 18: Watersheds in Tennessee

Continental Basin	Regional Hydrologic Unit	Watersheds
Lands Draining into the Atlantic Ocean	South Atlantic – Gulf	Conasauga River
Lands Draining into the Gulf of Mexico	Tennessee	Duck River, Elk River, and the western Tennessee River Valley Lower Tennessee River in East Tennessee up to and including the Hiawassee River; Upper Tennessee River in East Tennessee upstream of the Hiawassee, the Little Tennessee, the Clinch, and the Emery Rivers; French Broad River and the Nolichuckey River Holston River and the Watauga River.
	Ohio	Lower Cumberland River to the downstream point of the mouth of the Caney Fork River, the Harpeth and the Stones Rivers; Tributaries of the Barren River; Upper Cumberland River, the Caney Fork, the Obey, and the Big SouthFork of the Cumberland River;
	Lower Mississippi	Mississippi River and all of its tributaries west of the Tennessee River Valley

5.13.1 Inter-Basin Transfers

Tennessee has specific legislation that allows water to be transferred between major basins. Ten major watersheds and combinations of watersheds are defined in the *Inter-Basin Transfer Act*, and the Act allows transfers for public water supply systems or any other use that State grants. Individuals who wish to transfer water between basins must first obtain one of two types of permits: an individual permit for a specific project or a general permit that applies to a group or class of projects. Notice of the proposed transfer must be provided in both the donating and receiving basins, and a hearing is held after a specified comment period. In deciding whether to approve an inter-basin transfer, factors for consideration include:

- Quantity of withdrawal from a source with special concern for low flow conditions;
- Protection of present and projected water uses from "donating" water source;
- Effects on water quality on "donating" water source during low flows;
- Whether the water is for beneficial use;
- Ability of "donating" source to respond to emergencies, including drought;
- Effect on navigation, power generation, fish and wildlife habitat, aesthetics, and recreation
- The effect on flow and its impact on existing users of the "donating" source

Overall, the needs of the donor basin must be satisfied before a transfer can occur.

Permits are issued with terms and conditions related to the amount of water that can be transferred (including seasonal variations), thresholds below which transfers are not allowed, provisions to promote adequate water supply or to mitigate future adverse conditions, installation of stream flow monitoring equipment, and reporting. To date seven permits for 9.44 million gallons per day (13,043 dam^3 per year) have been approved.

5.13.2 Intra-Basin Transfers

There are no specific prohibitions on transfers between sub-basins within the 10 watersheds or combinations of watersheds named in the *Inter-basin Water Transfer Act*. However, the general provisions of riparian rights preclude the transfer of water to an area that is not upstream or downstream of a diversion point.

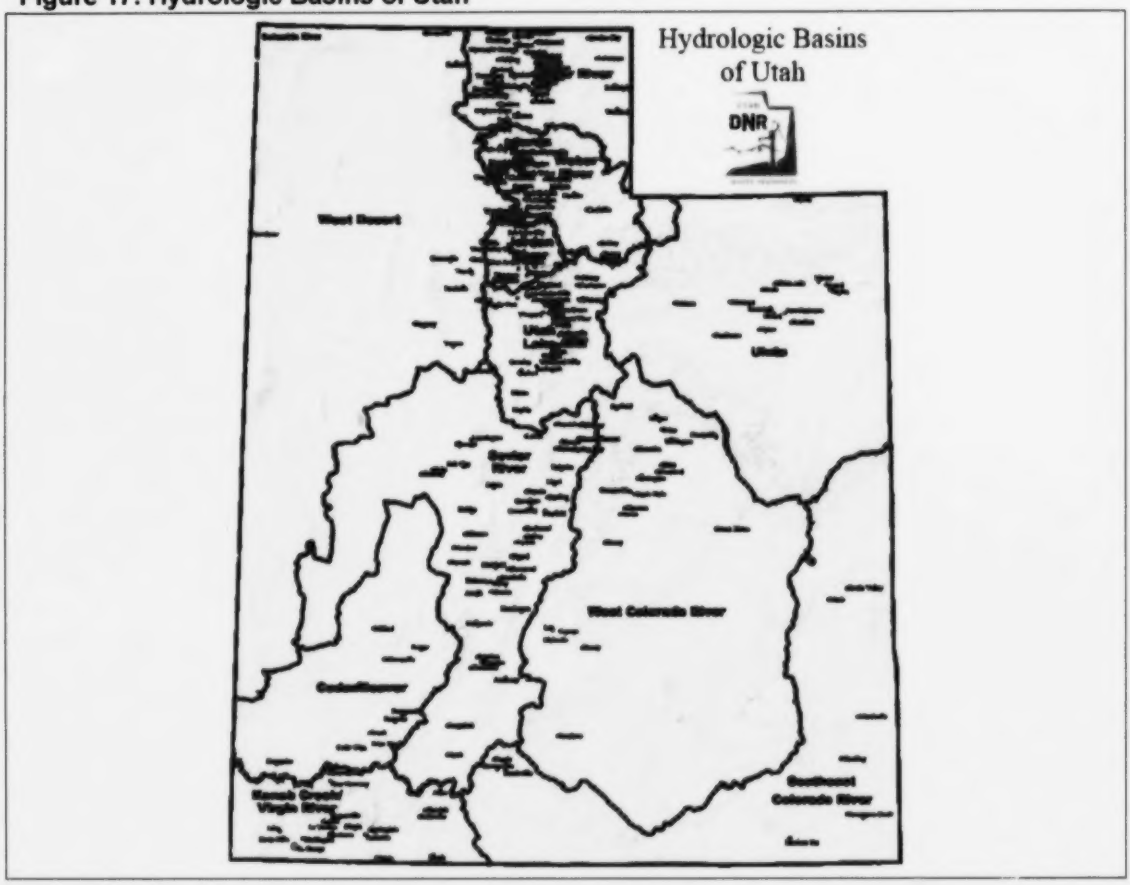
5.14 UTAH

Utah identifies 11 hydrologic basins. These are shown in Figure 17. The western half of the state consists of seven hydrologic basins that drain into the Great Basin hydrologic unit, which is an endorheic basin (i.e., does not drain into an ocean). The other four hydrologic units are part of the Colorado River basin: three in the upper Colorado hydrologic unit and one in the lower Colorado hydrologic unit. While the northwest corner of the state actually drains into the Pacific Northwest hydrologic unit, Utah has not identified this as a distinct hydrologic unit.

Table 19: Major Hydrologic Basins in Utah

Continental Basin	Regional Hydrologic Unit	Hydrologic Basins
Lands Draining into the Gulf of California	Lower Colorado	Virgin / Kanab River Basin
	Upper Colorado	Southeast Colorado River Basin Uinta River Basin West Colorado River Basin
Non-draining Basin	Great Basin	Bear River Cedar / Beaver River Basin Lower Jordan River Basin Upper Jordan River Basin West Desert / Columbia River Basin Weber River Basin Sevier River Basin

Figure 17: Hydrologic Basins of Utah



5.14.1 Inter-Basin Transfers

Utah statutes allow the place of use of an existing water right to be changed. The law does not prohibit new appropriations from transferring water to other basins; however the State Engineer must approve the change or transfer. Water may also be exported for use in other states. Proposals to export water to other states are subject to criteria and requirements outlined in legislation that are additional to criteria and requirements for other changes or transfers.

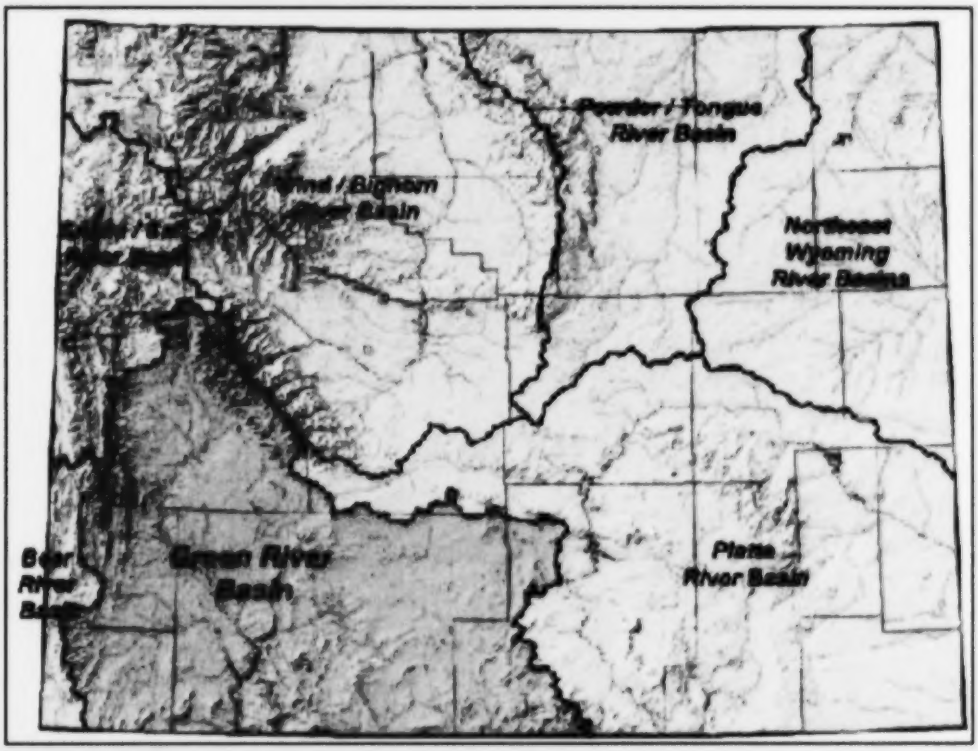
5.14.2 Intra-Basin Transfers

Utah's statutes do not distinguish between intra-basin transfer applications and other applications. In both cases the State Engineer must approve an application, and the same criteria and requirements apply to both.

5.15 WYOMING

From the perspective of state water planning there are 13 major river basins in Wyoming. As shown in Table 20, these basins are located in four regional hydrologic units that fall within three continental basins.

Figure 18: Major River Basins in Wyoming



The vast majority of rivers in Wyoming (nine river basins) are situated in the Missouri hydrologic unit and drain in a south easterly direction into the Gulf of Mexico. The Green River Basin (which includes the Green/Great Divide and Little Snake River basins – see Figure 18) drains south into the Colorado drainage and eventually into the Gulf of California and the Pacific Ocean. The Snake-Salt/Henrys Fork River Basin drains west into the Pacific Ocean while the Bear River Basin drains into the Great Basin which does not drain into any ocean.

Table 20: Major River Basins in Wyoming

Continental Basin	Regional Hydrologic Unit	Major River Basins
Lands Draining into the Pacific Ocean	Pacific Northwest	Snake-Salt/Henrys Fork River Basin
Lands Draining into the Gulf of California	Upper Colorado	Green/Great Divide Basin Little Snake River Basin
Lands Draining into the Gulf of Mexico	Missouri	Gallatin/Madison River Basin Yellowstone/Clarks Fork River Basin Bighorn/Wind River Basin Tongue/Powder River Basin North Platte River Basin South Platte River Basin Little Missouri River Basin Belle Fourche/Cheyenne River Basin Niobrara River Basin
Non-draining Basin	Great Basin	Bear River Basin

5.15.1 Inter-Basin Transfers

Wyoming allows inter-basin transfers. The Water Development Commission addresses the impact of the diversion and recommends measures to mitigate any adverse effect in the basin of origin. There is no definition of basins or sub-basins.

5.15.2 Intra-Basin Transfers

Wyoming allows transfers between sub-basins. The Water Development Commission addresses the impact of the diversion and recommends measures to mitigate any adverse effect in the basin of origin. There is no definition of sub-basins.

5.16 SUMMARY

5.16.1 Transfers Between Continental Basins

Table 21 provides a summary of the water management legislation related to transfers of water between continental basins for each of the jurisdictions considered in this study. All of the Canadian provinces reviewed, except for Manitoba, straddle two or more continental basins and all have provisions that prohibit the transfer of water between these continental basins, with some exceptions. In general, any inter-basin transfer existing prior to the legislation was allowed to continue (grandparenting) and some jurisdictions may allow transfers of small volumes of water. Alberta allows transfers between continental basins only if approved by a special act of the legislature. While Saskatchewan and Manitoba each have legislation that prohibits transfers between continental basins, the prohibition is Saskatchewan is limited to transfers outside the province and is irrelevant in Manitoba which is entirely located in one continental basin (Hudson Bay).

Table 21: Summary of Legislation Related to Transfers between Continental Basins by Jurisdiction

Province/State	Number of Basins	Allowed	Exceptions	Instrument
Alberta	3	No	Special act of legislature	Special act of legislature Water licence
British Columbia	2	No	Small volumes	Water licence
Saskatchewan	2	No	Within Saskatchewan	Water licence
Manitoba	1	No	In the public interest	Water licence
Ontario	2	No	Grandfathered projects	Permit
Arizona	1	Allowed	Out of state	Permit
California	2	Allowed	Out of state Wild Scenic River systems	Permit and Licence
Colorado	2	Allowed	Out of state	Voluntary negotiated agreements
Montana	2	Allowed	Department only for amounts> 4,000 acre-feet	Permit
North Carolina	2	Allowed		Small – registrations Large - approvals
North Dakota	2	Allowed		Permit IJC approval
Tennessee	2	Allowed		Registration to take water Permit to transfer
Utah	2	Allowed		Approval of State Engineer
Wyoming	4	Allowed		Permit Certificate of Appropriation

For the western states, transfers of water between continental basins and between and within major basins have regularly been allowed so that water can be used wherever it is needed, and these states generally encourage transfers that allow more intensive use of developed water resources (California). If restrictions on transfers do occur, these are usually in the form of prohibitions against transferring water out-of-state because these would either diminish a state's entitlement or conflict with inter-state water agreements. Like any other proposed appropriation for beneficial water use, persons wishing to transfer water between continental or between and within major basins must apply for permits or licences to state authorities for approval, using the same process as for other applications.

Both Tennessee and North Carolina, which have riparian systems that would inherently limit transfers of water outside defined watersheds, have developed legislation that specifically

defines major basins, including continental basins and allows transfers between these basins subject to registering these activities or receiving the required permits or approvals.

5.16.2 Inter-Basin Transfers

A summary of the water management legislation related to inter-basin transfers is provided in Table 22, where basins are defined in terms of major basins or watersheds within continental basins. In some cases major basins, watersheds or hydrologic units have been specifically defined in legislation. For most western states, there is no legislative definition, but they have typically identified specific major basins or watersheds for water planning purposes.

Table 22: Summary of Legislation Related to Inter-Basin Transfers by Jurisdiction

Province/State	Number of Major Basins/ Watersheds	Allowed	Exceptions	Instrument
Alberta	7	No	Special act of legislature	Special act of legislature Water licence
British Columbia	9	No	Small volumes	Water licence
Saskatchewan	As yet undefined	No	Within Saskatchewan	Water licence
Manitoba	As yet undefined	No	In the public interest	Water licence
Ontario (awaiting proclamation)	5 (Great Lakes Basin)	Prohibited	municipal purposes <19 million litre/day other purposes <379,000 litres/day	Permit
Arizona	14	Allowed	Out of state	Permit
California	10	Allowed	Out of state Wild Scenic River systems	Permit and Licence
Colorado	4	Allowed	Out of state	Voluntary negotiated agreements
Montana	4	Allowed	Department only for amounts> 4,000 acre-feet	Permit
North Carolina	18	Allowed		Small – registrations Large - approvals
North Dakota	13	Allowed		Permit
Tennessee	10	Allowed		Registration to take water Permit to transfer
Utah	11	Allowed		Approval of State Engineer
Wyoming	13	Allowed		Permit Certificate of Appropriation

All of the Canadian provinces reviewed also have provisions that prohibit the transfer of water between major watersheds, with some exceptions. Again, any inter-basin transfer existing prior to the legislation was allowed to continue (grandparenting) and this was important in BC and Ontario where some large inter-basin transfers have historically been approved for hydroelectric power production. Some jurisdictions allow transfers of small volumes. Alberta allows inter-basin transfers only if approved by a special act of the legislature. However, as neither Saskatchewan nor Manitoba has regulations that define basins, inter-basin transfers are still allowed as long as the benefits in the receiving basins exceed any costs to the donor basins. Ontario is in the process of prohibiting transfers of water between the five major basins in the Great-Lakes watershed and this is being done in response to its role as a signatory to the Great Lakes – St. Lawrence Basin Sustainable Water Resources Agreement.

As noted above, all of the US states reviewed for this study allow inter-basin transfers, either by appropriating water rights or by acquiring the appropriate approvals. Applications for transferring water between basins would involve the same regulatory process as for acquiring any sort of water right, although there can be additional considerations for out of state transfers. With a few exceptions (Tennessee and North Carolina), state legislation does not include definitions of watershed units and some states are organized into water districts with their own decision-making powers.

5.16.3 Intra-Basin Transfers

Intra-basin transfer refers to the diversion of water from one sub-basin to another within the same major basin or watershed. The review of legislation (Table 23) shows that, with some exceptions, sub-basins are not defined in legislation and, even where they are defined, transfers between sub-basins are either allowed or not expressly prohibited. The legislation offered very little additional information with respect to intra-basin transfers. Both Tennessee and North Carolina explicitly accept intra-basin transfers, subject to review and approval by state authorities. Ontario is awaiting assent on legislation that would prohibit transfers between defined five Great Lakes watersheds with some exceptions. These exceptions are for water for municipal purposes where there is no other alternative viable source and the return flow must go back to the donor basin, and for other purposes in very small amounts (138 dam^3 per year). Persons seeking transfers must apply for permits and applications are subject to review by all the states and provinces who are signatories to the Agreement.

Of the western Canadian provinces, only Manitoba explicitly prohibits the transfer of water within a major basin. However, this prohibition is not yet in effect because there are no definitions of sub-basins in the regulations. Consequently, at the present time, there are no laws or regulations that prevent intra-basin transfers in any of the four western provinces. Persons wishing to transfer water from one sub-basin to another would have to apply for and receive licences that would allow the transfer, with the licensing procedures being the same as for any other type of water licence application.

As noted previously, intra-basin transfers have regularly been used in the western states, to take water from one part of a basin for use in another sub-basin, and states actually encourage transfers that would allow more intensive use of developed water resources.

Table 23: Summary of Legislation Related to Intra-Basin Transfers by Jurisdiction

Province/State	Number of Sub-basins	Allowed	Exceptions	Instrument
Alberta	Not defined	Not prohibited	None	NRCB approval Water licence
British Columbia	Not defined	Not prohibited	None	Water licence
Saskatchewan	As yet undefined	Not prohibited	None	Water licence
Manitoba	As yet undefined	Prohibited in legislation	Prohibition not functional until sub-basins defined	Water licence
Ontario	Not defined	Not prohibited	None	Permit
Arizona	Not defined	Allowed	None	Permit
California	Not defined	Allowed	Non	Permit and Licence
Colorado	Not defined	Allowed	None	Approval of water courts
Montana	85 sub-basins	Allowed	None	Permit
North Carolina	38 sub-basins	Allowed	None	Small – registration Large - approval
North Dakota	Not defined	Allowed	None	Permit
Tennessee	Not defined	Not prohibited	None	Registration to take water
Utah	Not defined	Allowed	None	Approval of State Engineer
Wyoming	Not defined	Allowed	None	Permit Certificate of Appropriation

6.0 SUMMARY

This comparative assessment of water management practices among jurisdictions has demonstrated some important difference and similarities among Canadian provinces and selected states within United States with respect to how water is managed, and their approaches to inter- and intra-basin transfers. These similarities and differences are described in the following sections.

6.1 WATER MANAGEMENT SYSTEMS

Table 24 provides a general comparison of the three types of surface water rights systems considered in this report. The most important differences are that:

- prior allocation systems create statutory rights to divert and/or use water on the basis of first in time, first in right;
- prior appropriation systems are largely grounded in common law but may codified by, limited or enhanced by statute; and,
- riparian systems operate under common law which creates rights to use water based on riparian ownership or occupancy.

Both riparian water rights and prior appropriation rights evolved at common law whereas prior allocation water rights arise through statutory authorization.

Table 24: Key Characteristics of Water Rights Systems

Attribute	Riparian	Prior Appropriation	Prior Allocation
Type of Right	Ability to take water (no right)	Property Right	Right to Divert
Priority	None, unless overridden by statute. Shortages shared equally.	First in time, first in right	First in time, first in right
Recognition of instream flows	Factored in decisions on permits	Must appropriate water and receive permit	Conditions in licences Crown reservations Instream licences (some)

The reason for having different systems is largely a function of geography. In eastern Canada and the US, water is relatively abundant and the common law provided a simple mechanism for allowing riparian landowners to share available water. In western Canada and the US, water is scarce and a system other than riparian rights was needed to allow water to be used on lands that were not immediately adjacent to a water body and to identify who had the rights to use water during shortages. In the US, the prior appropriation water rights system developed at common law so that persons and industries that needed water and were not riparian owners could acquire water rights. Courts eventually recognized prior appropriation rights as a usufructory right (the right to use water even though it is owned by the state), which is a kind of property right. In western Canada, a prior appropriation system was not developed at common law. Instead, the North-west Irrigation Act of 1894 created prior allocation rights that employed an administrative system to allocate water rights to applicants. Over time, most western states have adopted statute-based administrative systems to manage water rights with the result that their prior appropriation systems resemble the prior allocation systems in use in western

Canada. In addition, most prior allocation and a number of prior appropriation systems recognize a limited riparian right for small users living adjacent to water bodies (i.e. household purposes in Alberta).

A second key difference among systems relates to how water is allocated among users in the cases of shortages. Since access to water is shared under a riparian system, shortages must also be shared unless there is a statutory instrument, such as an accepted plan, that recognizes some classes of water use as being more important than others. Under both the prior allocation and appropriation systems, water users generally have priority among themselves according to the seniority of their licence.

The three systems also vary significantly in terms of how they treat water requirements for instream flows. Riparian systems require that water uses be reasonable and that water be returned substantially unaltered in quality or quantity to the source stream. In practice, this means that potential effects on rivers and lakes are considered as part of the administrative process used to evaluate applications for permits. A similar practice is used in prior allocation systems, where terms and conditions can be added to licences that would limit withdrawals under low flow conditions. In addition, prior allocation systems allow water to be reserved for instream purposes and, in some jurisdictions, water licences can be issued for instream purposes. Under prior appropriation systems, instream use must be recognized as a beneficial use so that water can then be appropriated for use and/or issued a permit or licence. Most western states recognize instream uses as being beneficial.

In most other regards (except transfers among and within basins), the three systems are quite similar. Most jurisdictions have developed some sort of system for keeping track of the demands people are placing on the resource, either registrations or permits for riparian systems while prior allocation and appropriation systems issue licences or permits. Colorado still uses the water courts as its administrative system. Depending on the jurisdiction, these administrative systems may require water users to register or submit an application. Most jurisdictions use a screening process to determine whether the registration or application should be approved and may provide an opportunity for public review of applications. All systems provide limited opportunities for decisions on applications to be appealed. In addition, all systems allow registrations, licences or permits to be revoked if water is not being used in accordance with the terms and conditions specified in these instruments or, in the case of riparian rights and appropriation rights, in accordance with common law requirements. Subject to any statutory limitations, riparian rights and prior appropriation rights, as property rights, also allow third party enforcement.

6.2 DEFINITION OF RIVER BASINS

Nearly all the jurisdictions considered in this assessment straddle two continental basins. The exceptions are Manitoba, which is entirely situated in one continental basin, and Alberta, Montana and Wyoming, which are situated in three continental basins.

Even though most states and provinces straddle continental basin boundaries, the literature review shows that individual jurisdictions do not explicitly recognize continental basin boundaries or manage water at this scale. Instead, each jurisdiction has defined numerous major river basins, watersheds, or hydrologic units, usually as subdivisions of the continental basins, and manages water at this scale. These "major" basins can be very large (Colorado and Montana each recognize only four basins at this scale) or very small (North Carolina recognizes 18 such basins).

While each jurisdiction has numerous administrative definitions of major basins, these basin boundaries are not always specifically recognized or described in water management legislation. Basin boundaries are not usually defined in legislation unless there are some specific provisions in the legislation that need to differentiate one major basin from another. In those states that employ a prior appropriation system of water rights, water transfers between basins are not prohibited so there is no need to define major basins (or sub-basins) in legislation. On the other hand, in order to allow transfers of water between basins in those states that uses a riparian systems, where transfers are normally prohibited, specific statutes are required to enable transfers between major basins that must be named. Thus, Tennessee and North Carolina have legislation that identifies major basin boundaries while the western states do not.

The five provinces included in this assessment also define major basins in their legislation, primarily because they have specifically chosen to prohibit transfers between major basins. Alberta, British Columbia, and Ontario have each adopted definitions of major basins that address their specific water management objectives. In Alberta, for example, the Bow, Oldman, and Red Deer rivers have been defined to be one major basin because, under the terms of the Apportionment Agreement, they must be jointly managed. While Saskatchewan and Manitoba each have statutory prohibitions against inter-basin transfer, the required basin definitions have not yet been described in regulations. Ontario has identified five sub-basins in the Great Lakes – St. Lawrence basin in order to comply with the requirements of the Great Lakes – St. Lawrence Basin Sustainable Water Resources Agreement.

6.3 INTER-BASIN TRANSFERS

Under riparian systems, transfers between continental basins or between major basins are prohibited because of the nature of the riparian right, which allows persons to withdraw water in a manner that does not damage other riparian users without their consent. Thus, riparian systems are essentially watershed based systems, so any attempt to withdraw major volumes of water would be unacceptable because of potential effects on other users, unless specifically allowed by way of some sort of statutory mechanism. There is no such enabling mechanism in Ontario. However, both Tennessee and North Carolina have statutes that allow transfers and define the mechanism and process by which transfers among continental and major basins can occur.

As prior appropriation systems completely detach water rights from land rights, water users in one continental or major basin are not prohibited from and, in fact, are actually encouraged to

draw water from another basin. Water management in the western states typically features the development of major water storage projects and canal systems that move water from its source to where it is needed, with little heed for watershed boundaries. In fact, inter-basin transfers are so common that some states have implemented "area of origin" statutes that employ one of three approaches to restrict inter-basin transfers (Reisner and Bates, 1999):

Prohibitions against or severe restrictions on diversions	Arizona and Montana
Reservation of water or preferences for those living in areas of origin	California
Compensation for harm suffered by the export basins	Colorado

Some states have also sought to restrict interstate water exports by statute. As the courts have determined that water is an article of inter-state commerce, complete prohibition is not possible. Many states have developed inter-state compacts that limit exports. Thus, transfers of water between continental and major basins are a key element of prior appropriation systems and states must use statutes to control these transfers. With respect to accepting inter-basin transfers, prior appropriation systems are the exact opposite of riparian systems.

For prior allocation systems, there has until recently been no clear legislative direction as to whether transfers of water between basins are allowed or prohibited. Historically, a number of projects that allow the transfer of water between continental or major basins have been approved. For example, British Columbia has allowed a number of large inter-basin transfers for hydroelectric projects (e.g. Alcan's Kemano project). Over time Alberta has approved a number of projects that allowed water for irrigation to be transferred between the Oldman, Bow, and Red Deer basins (which were only recently declared not to be major basins).

However, due to increasing concerns about water exports, environmental issues (trans-faunation), and concerns that water transfers would adversely affect economic development in potential donor basins, all the western provinces have recently implemented statutory restrictions on transfers between major or continental basins by introducing new legislation or amending existing legislation. For example, British Columbia passed the *Water Protection Act* in 1996 and Alberta passed its *Water Act* in 1999. However, a review of these prohibitions indicates that they are not absolute. Each piece of legislation offers some opportunities for transfer by way of exemption. In Alberta, the exemption is by a special act of the legislature. In Saskatchewan and Manitoba, in the absence of regulations defining basins and sub-basins, exports are still possible within Saskatchewan or for purposes of the public interest in Manitoba, with approvals through the water licensing systems. British Columbia allows small quantities of water (10 cubic metres per second) to be transferred between major basins, with approval through the licensing system. Thus, current legislation for provinces with prior allocation systems indicates that inter-basin transfers are generally prohibited, except where allowed by regulatory or statutory exemption.

6.4 INTRA-BASIN TRANSFERS

As noted above, all of the US states that use prior appropriation allow water transfers between and within basins, by obtaining the necessary permits and approvals, so there is no need to include definitions of basins or sub-basins in legislation. In North Carolina, which uses riparian systems, intra-basin transfers are allowed by statute and 38 sub-basins have been defined.

In Canada, both Ontario and Manitoba prohibit transfers between some sub-basins. In Ontario, this prohibition and the associated definition of sub-basins is a requirement of the Great Lakes – St. Lawrence Basin Sustainable Water Resources Agreement, and similar restrictions are required of all the states and provinces that are signatories to this Agreement. While Manitoba legislation prohibits transfers between sub-basins, this cannot be enforced because sub-basins have not yet been defined. Legislation for the other three provinces does not prohibit intra-basin transfers. Thus, it is expected that intra-basin transfers are possible as long as appropriate water licences are acquired.

REFERENCES: GENERAL

Abrams, Robert. 1983. "Interbasin Transfer in a Riparian Jurisdiction" (1982-83) 24 William and Mary Law Review 591 – 623.

Anderson, M. et al, "The Water Supply of Arizona" in Arizona Water Supply 44-45

Beck, Robert and John C. Hart. 1975. "The Nature and Extent of Rights in Water in North Dakota" (1974-75), 51 ND Law Review 249 – 314.

Benidickson, Jamie. 2007. The Culture of Flushing: A Social and Legal History of Sewage, Vancouver, UBC Press.

Council of Great Lakes Governors, Available at http://www.cglg.org/

Day, J.C. and Quinn, Frank, 1992 Water Diversion and Export: Learning from Canadian Experience, Department of Geography, University of Waterloo

Getches, David H., 1977. Water Law in a Nutshell. St. Paul, Minn.: West Publishing Co.

Ghassemi, Fereidoun and Ian White. 2007. Inter-Basin Water Transfer: Case Studies from Australia, United States, Canada, China and India, Cambridge, Cambridge University Press, 2007

Glennon, R.2007. "The Disconnect between Water Law and Hydrology", in B. Colby and K. Jacobs, Arizona Water Policy (RFF Press: Washington, 2007) 106-119

Holland & Hart, LLP, Summary of the Law of Water Rights in Colorado. Available at http://www.westernwaterlaw.com/SummaryCoWaterLaw.pdf

IJC. 2000. Final Report of the International Joint Commission to the Governments of the United States and Canada concerning protection of the waters of the Great Lakes, 2000.

Jacobs, K. "Water Rights, Sources, and Issues". Available at http://cals.arizona.edu/AZWATER/publications/townhall/Chapter5.pdf

Johansen, David, 2007. Bulk Water Removals: Canadian Legislation. Library of Parliament. PRB 02-13E. Available at http://www.parl.gc.ca/information/library/PRBpubs/prb0213-e.pdf

Kempf, Bart 2007. "Draining Devils Lake: The International Law Making Problems Created by the Devils Lake Outlet", 19 Geo. Int'l L Rev. 239.

Lasserre, Frédéric. 2007. "Drawers of Water: Water Diversions in Canada and Beyond" in Bakker, Karen (ed), Eau Canada: The Future of Canada's Water, Vancouver, UBC Press, pp.143 - 162

MacDonnell, Lawrence and Charles Howe. 1986, "Area of Origin Protection in Transbasin Water Diversions: An Evaluation of Alternative Approaches" (1985-86), 57 University of Colorado Law Review 527 – 548

Marble, Curtis. No date. Leaving some for the Fish: Preserving Instream Flows in a Prior-Appropriation Regime. Research paper, University of Calgary.

Montana Department of Natural Resources and Conservation, Legislative Environmental Water Quality Council, and the Montana University System Water Center. 2004. Water Rights in Montana. Available at http://dnrc.mt.gov/wrd/water_rts/wr_general_info/waterrights_in_montana.pdf

Oeltjen, Jarret, Ricarh Harnsberger and Ralph Fischer. 1972. "Interbasin Transfers: Nebraska Law and Legend" (1971-72), 51 Nebraska Law Review 87 – 146.

Quinn, Frank, J.C. Day, Michael Healey, Richard Kellow, David Rosenberg and J. Owen Saunders, 200?, "Water Allocation, Diversion and Export" in Threats to Water Availability and Canada" pp. 1 - 8

Quinn, Frank. 1968. "Water Transfers: Must the American West be Won Again" (1968), 58(1) Geographical Review 108 – 32.

Reisner, Marc and Sarah Bates. 1990. Overtapped Oasis: Reform or Revolution for Western Water Law. Island Press, Washington, D.C.

Richardson, Boyce. 1975. Strangers Devour the Land, Toronto, McMillan

Sagsveen, Murray, "North Dakota" in Beck (ed) Waters and Water Rights.

Statistics Canada. 2003. Human Activity and the Environment: Annual Statistics 2003. Statistics Canada, catalogue no. 16-201-XIE

Trotta, L.C., "Inventory of Inrterbasin Water Transfers in Minnesota" USGS, 1988 available at http://www.swc.state.nd.us/4dlink9/4dcgi/GetSubContentPDF/PB-801/USGS_MNDNR_Report.pdf

US Geological Survey, 2007. Hydrologic Unit Map (Based on Data from USGS Water-Supply Paper 2294. Available at http://water.usgs.gov/GIS/regions.html.

Waldram, James B., As Long as the Rivers Run: Hydroelectric Development and Native Communities in Western Canada, Winnipeg, University of Manitoba Press, 1988.

Westesen, Gerald and Michelle Bryan. 1997. Wading into Montana Water Rights. Available at http://water.montana.edu/topics/policy/manuals/rights.pdf.

World Commission on Dams. 2000. Dams and Development. A New Framework for Decision Making. The Report of the World Commission on Dams. Available at http://www.dams.org/report/

LEGISLATION AND POLICY CONSULTED

Alberta

Water Act and Regulations

Irrigation Districts Act

Environmental Assessment (Mandatory and Exempted Activities) Regulation

British Columbia

Water Act

Water Protection Act

Columbia Basin Trust Act

Fish Protection Act

Saskatchewan

Saskatchewan Watershed Authority Act, 2005 and Regulations

Water Power Act and regulations

Irrigation Act and Regulations

Water Appeal Board Act

Environmental Management and Protection Act and Regulations

Conservation and Development Area Act

South Saskatchewan River Development Commission Act, SS 1959, c.100.

Manitoba

The Water Rights Act

The Water Rights Regulation 126/87

Water Resources Conservation Act

Water Protection Act

Water Power Act

Water Power Regulations

Sustainable Development Act

Environment Act

Manitoba-Ontario Lake St Joseph Diversion Agreement Authorization Act

Ontario

Ontario Water Resources Act

Water Taking and Transfer Regulation

Environmental Protection Act

Nutrient Management Act

Pesticides Act

Safe Drinking Water Act

Lakes and Rivers Improvement Act

Fisheries Act (Federal)

The Great Lakes Charter

Arizona

Arizona Constitution, Article 17

Arizona Title 45

Arizona Department of Water Resources Administrative Rules, Title 12, Ch. 15.

Colorado River Basin Project Act of 1968, U.S. Code Vol. 43, §1501 et sec.

Endangered Species Act of 1973, U.S. Code, Vol. 33, § 1251 et seq.

California

California Constitution, Article 10, Water & Article 10A, Water Resource Development

Title 23: California Water Code

California Public Resources Code [includes Chapter 5093, California Wild & Scenic Rivers Act]

Other Codes with provisions that relate to water include: Fish & Game Code, Health & Safety Code, Food & Agriculture Code, Harbors & Navigation Code, Public Resources Code

U.S. Department of the Interior, Bureau of Land Management; California Water Law Facts Sheet. Available at http://www.blm.gov/nstc/WaterLaws/california.html

Colorado

State Constitution Article XVI §§ 5 and 6; C.R.S. § 37, arts. 80 - 92., and C.R.S. §§ 37-92-101 through 37-92-602

Colorado Water Conservation Board Report (December 2004) Available at http://cwcb.state.co.us/IWMD/pdfDocs/Report/SWSI8-pgReportSummary3.pdf

Colorado State Judicial Branch – Water Courts: Available at http://www.courts.state.co.us/supct/supctwaterctindex.htm

Colorado Division of Water Resources: A Division of the Department of Natural Resources: Available at http://water.state.co.us/default.asp

Montana

Montana Constitution, Article IX

Montana Water Use Act, Title 85, c.2 Montana Code Annotated

Department of Natural Resources and Conservation, Water Rights Bureau, Administrative Rules, c.12

Environmental Policy Act, Title 75, Montana Code Annotated

Yellowstone River Compact 1950 (MT, ND and Wyoming)

Boundary Waters Treaty, Article VI re the Milk and St. Mary Diversion

North Carolina

Water Use Act(state)

Environmental Policy Act (state)

Clean Water Act (federal)

Endangered Species Act (federal)

North Dakota

North Dakota Century Code (NDCC) title 61 (Waters)

ND Constitution, Article XI(3)

Little Missouri State Scenic River Act

Yellowstone River Compact 1950 (MT, ND and Wyoming

Dakota Water Resources Act, 2000

National Environmental Protection Act, 1969 (NEPA)

Water in North Dakota: A Reference Guide, North Dakota State Water Commission, 2005

North Dakota State Water Management Plan, 1999. Available at http://www.swc.state.nd.us/4dlink9/4dcgi/GetContentPDF/PB-950/1999StateWaterMgmtPlan.pdf

Yellowstone River Compact http://cr.water.usgs.gov/YRCC/

Tennessee

Watershed District Act (state)t

Water Quality Control Act (state)

Inter-Basin Water Transfer Act (state)

Tennessee Safe Drinking Water Act (state)

Water Withdrawal Registration Act (state)

Tennessee Valley Authority Act (federal)

Clean Water Act (federal)

Endangered Species Act (federal)

Utah

Utah Code – Title 73

Wyoming

Wyoming Constitution

Title 41 – Wyoming Statutes

APPENDIX A

Terms of Reference

Terms of Reference

Comparison of Water Allocation Process in Alberta to Other Jurisdictions

1.0 BACKGROUND

The Alberta Water Council was established in 2004 to provide direction and advice to the Government of Alberta, stakeholders and the public on matters related to the *Water for Life* strategy. In January 2007, in response to public concerns about a water licence application in central Alberta, Environment Minister Rob Renner asked the Council

> *"to determine if the current approach to making decisions about the movement of water from one sub-basin for use in another sub-basin within the same major river basin is still valid and what, if any, changes should be made to the current approach and under what conditions."*

Council agreed to advise the Minister on this matter and established an Intra-Basin Water Movement (IBWM) Project Team to report on the issue.

In reviewing the question, the IBWM project team has established that the question may be subdivided into 2 components

1. The regulatory process and considerations (ecosystem needs, riparian rights, instream flow needs, water conservation objectives, recreational needs, assimilative capacity, impact on other users, etc) used to determination the quantity of water available for consumptive use.
2. The regulatory process, considerations, and/or restriction (to the quantity, purpose of use, distance from source, etc) to various water users (riparian land owners, water users within the same watershed, water users within another sub-basin of the same a major basin, water users within another major basin) wishing to access water determined to be available for consumptive use.

To ensure that Alberta Water Council provides sound advice to the Minister, the IBWM Project Team deems it necessary to conduct a review and comparison of the water resource allocation process in Alberta to that of other jurisdictions. This review is intended to provide a general understanding of the water allocation process and considerations of the jurisdictions, and more specifically, to conduct a comparison to expressly highlight the regulations, considerations and/or restrictions placed on water determined to be available for consumptive use with respect to its diversion from one sub-basin for use in another sub-basin within the same major river basin.

2.0 PROJECT OBJECTIVES AND SCOPE OF WORK

The primary objective of this assignment is to prepare a report that, based on a review of regulatory processes and interviews with water regulators, provides a comparison of the regulatory process in Alberta to that in other jurisdictions, particularly within Canada and the United States, and any other jurisdictions deemed relevant, with respect to the process, regulations, considerations and/or restrictions that may place a limitation (location of use,

diversion quantity, purpose of use, etc) on the allocation or access to water that has been determined to be available for consumptive use to water users located outside the source basin or sub-basin. More specifically the review should focus on laws, regulations, policy, processes, and other considerations including restrictions that may place a limitation on access to the movement of water with emphasis on the comparing jurisdictional processes in the situations that involve the diversion or movement of water from one sub-basin for use in another sub-basin within the same major basin.

The comparison should include but not be limited to the following jurisdictions;

1. Canadian Provinces:
    a. British Columbia, Alberta, Saskatchewan, Ontario and Quebec
2. Unites States:
    a. California, Montana, Wyoming, Utah, Colorado, Arizona, North Dakota, North Carolina, and Tennessee

The contractor can propose to include in this comparison other jurisdictions, as accepted by the Project Team, by explaining their relevance and ensuring that their inclusion will not affect report delivery timelines.

One section of this review report will describe the main water rights doctrines (riparian, prior appropriation) in use in North America, and how each doctrine's principles (e.g. riparian, prior appropriation) influences legal/regulatory processes for determining:

- the quantity of water available for consumption,
- allocation, and
- rights to access water.

The second section of this review report will contain the more detailed jurisdictional comparisons with respect to policies and regulations respecting the diversion of water from one basin or sub-basin for use in another basin or sub-basin. Part 1 of the jurisdictional comparison focuses on the general water allocation process. In a table if possible, present a description for each jurisdiction that identifies and compares:

1. the water rights doctrine used,
2. the law governing water permits and/or intra-basin water permits,
3. the web or interview sources for the information in this report,
4. who has access to water and/or who is limited in their access to water,
5. what categories of water users exist, and the process for each category to divert and consume water (e.g. no permit, registration only, formal regulatory approval or licence or permit),
6. what special conditions or triggers for which water users are granted access to divert and consume water (e.g. volume or rate of water diverted, distance of water to use),

7. any regulatory requirements and/or restrictions placed on water users granted access to divert and consume water (public notification, quantity, purpose, location, etc) for each type of water user classification ,
8. any appeal processes,
9. the factors considered or process used in determining the quantity of water available for consumptive use (e.g. ecosystem requirements, in stream flow needs, watershed plans, water conservation objectives, impact on other riparian users, etc).

Part 2 of the comparisons will summarize each jurisdiction's approach to diversions of water from one sub-basin for use in another sub-basin, by addressing the following questions:

1. What is the criteria used to define a "Basin"?
    a. Include the definitions for "major basins", and "sub-basins" (include all definitions if multiple scales of basins are used).
    b. identify the purposes for which the definitions are used e.g. is it used in a regulatory system? Does it determine how far water can be used from the source?
    c. Discuss the criteria or rationale used to establish each layer of basin. Is size a criteria or factor?
    d. identify the relative sizes of the basins.
2. What is an "intra-basin" or "inter-basin" water diversion?
    a. Identify the factor used to trigger "intra-basin" or "inter-basin" regulatory requirements. (e.g. distance or basin definitions)
3. What are the rules regarding "intra-basin" water diversions?
    a. Compare to Alberta's system, the specific regulatory requirements, considerations, and/or restrictions (e.g. require a license, public notification, special act of legislature, quantity, purpose, location, etc) with respect to diversions that move water a distance from the source for:
        i. "inter" - a diversion from one major basin for use in another major basin.
        ii. "intra" - a diversion from one sub-basin for use in another sub-basin within the same major basin.
    b. Explain the rationale for each jurisdiction to regulate diversions of water across basins (distance).

Work on the project is to begin in August 2007. The contractor will compile, analyze, and draft the Comparison of Water Allocation Process in Alberta to Other Jurisdictions Report for the third week of September for approval by the project team. The project team's compiled questions or comments will be forwarded to the contractor for discussion for any revisions to the report. The final document must be completed by early October.

3.0 PROJECT MANAGEMENT AND DELIVERY EXPECTATIONS

The consultant will report to Project Manager Karen McCallion. Environmental Policy Branch 780-427-0501 Karen.McCallion@gov.ab.ca

APPENDIX B

Province and State Summaries

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
Legislative Overview					
Type of water rights system:	Alberta has a hybrid system that recognizes riparian and groundwater rights subject to the statutory quantity and use limitations but generally uses a prior allocation system based on first in time first in right.	British Columbia has a hybrid system that recognizes riparian and groundwater rights subject to statutory quantity and use limitations but generally uses a prior allocation system based on first in time first in right.	Saskatchewan has a hybrid system. New rights are acquired by licence but existing rights arising under earlier provincial or federal legislation are continued. Indian bands retain common law riparian rights in relation to reserve lands.	Manitoba has a hybrid system that recognizes riparian and groundwater rights for domestic purposes. Formally Manitoba uses the prior allocation system based on precedence of licence, according to the date of submission of the application.	Ontario has a riparian system of water management and employs a common property approach
List all pertinent legislation and regulations?	Water Act and Regulations Irrigation Districts Act Special acts for inter-basin transfers Environmental Assessment (Mandatory and Exempted Activities) Regulation Fisheries Act (Federal)	Water Act Water Protection Act Columbia Basin Trust Act Fish Protection Act	Saskatchewan Watershed Authority Act, 2005 and Regulations Water Power Act and regulations Irrigation Act and Regulations Water Appeal Board Act Environmental Management and Protection Act and Regulations Conservation and Development Area Act The Watershed Associations Act South Saskatchewan River Development Commission Act, SS 1959, c.100. In general Saskatchewan has elected to deal with many issues through licence terms and conditions rather than through the legislation. Saskatchewan's water legislation will be subject to a major review during the next	The Water Rights Act The Water Rights Regulation 126/87 Water Resources Conservation Act Water Protection Act Water Power Act Water Power Regulations Sustainable Development Act Environment Act Manitoba-Ontario Lake St Joseph Diversion Agreement Authorization Act	*Ontario Water Resources Act* *Water Taking Regulation* *Environmental Protection Act* *Nutrient Management Act* *Pesticides Act* *Safe Drinking Water Act* *Lakes and Rivers Improvement Act* *Fisheries Act* (federal) The Great Lakes Charter, Annex 2001 and Great Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement, 2005

			two years.		

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
Instream Requirements/Water Availability for Consumptive Uses					
How does the system determine how much water can be made available for consumption?	All water is available for consumption other than where restricted by: • Apportionment Agreement • Instream flow allocations or reservations • Conditions in licences (minimum flows) • Statutory limitations on director's discretion in determining licence allocations • Approved water management plans • Any moratoria or other government orders imposing restrictions	All water, for all purposes, is vested in government except for those that have been allocated under licences and approvals. Impacts on fish and fish habitat are considered as part of all decisions to allocated water for use.	The property in and the right to use all ground water and surface water is vested in the Crown. No person may divert or use water unless authorized by the SWA. New consumptive water rights are acquired by licence under the SWAA. There is a limited domestic use exception. Water may be withdrawn from allocation by the Minister.	All property and rights to use water are vested in the Crown. No person (except a domestic user) may use water without a licence. In considering a licence application the Minister must consider scientific and other information regarding groundwater levels, water body levels and the in-stream flows to ensure that aquatic ecosystems are protected and maintained.	All surface water takings over 50,000 litres per day are governed under the Ontario water resources act and the water Taking regulation. Exceptions include takings on federal or first nations land and other possible restrictions by international treaty (boundary water, Great lakes charter). A Director evaluates each proposed water taking to ensure that it meets the principles of the POTTW program, including the natural functioning of the ecosystem, preventing unacceptable interference with other users and air sharing and conservation of the resource. In addition the Water Taking regulation includes rules for water takings in high use watersheds, as defined in the regulations, and uses which remove water our of watersheds, such as beverage manufacturing. Where there is a high level of water use in a watershed relative to existing water flows, the Ministry of the Environment Director is required to refuse permits for new or expanded takings that remove water from a watershed.
Are there limitations related	Water conservation objectives, including minimum flow or	The Crown may reserve all or part of the unallocated water	The SWA may issue a water rights licence "subject to any	The minister may reserve unlicenced water "for the	A Director must consider environmental requirements

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
to instream or environmental requirements and what is the mechanism for this?	other flow rates have been established for some rivers. These have been and continue to be developed by watershed advisory committees that attempt to balance environmental requirements against licence commitments.	for any purpose. Water reserves are established under an Order in Council and withhold all or part of "unrecorded" water. A streamflow protection licence may also be issued for fish and fish habitat. In times of drought, temporary orders limiting water diversions can be made. Reductions in water allocations in licences can be done under an cabinet-approved water management plan.	terms and conditions" for any water except water that is allocated to another or withdrawn by the Minister.	greatest advantage of the citizens of the province" The Minister may undertake scientific investigations into water body levels and in-stream flow levels anywhere in Manitoba "to determine whether aquatic ecosystems are being negatively affected by insufficient levels or flows." Watershed management plans are being developed (under the Water Protection Act) at a conservation district level (35 by 2010) to determine the balance between environmental requirements and licence commitments. Focus is source water protection rather than instream flows.	when issuing a permit. These considerations include the natural functioning of the ecosystem: natural variability of water level, minimum stream flow and habitat that depends on flow. Other considerations include interrelationships between surface and groundwater. The Ministry of Environment relies on other agencies for comment and recommendations on applications. This includes the Ministry of Natural Resources, which is responsible for fisheries management, wetlands, endangered species and species at risk. The Ministry also contacts the Conservation Authority (CA) or the Department of Fisheries and Oceans (DFO) where CA does not exist. Conservation Authorities have service agreements with DFO to undertake screening of projects under the federal *Fisheries Act*. That Act prohibits harmful alteration, disruption or destruction of fish habitat and plays a role in permitting decision. Standard conditions as well as site-specific conditions where appropriate are placed on permits to minimize environmental impacts and to prevent unacceptable interference.
What factors are considered or	Habitat requirements for fish,	Terms and conditions related to fish and fish habitat can be	On an application for a licence the SWA may forward an	The in-stream flows to ensure that aquatic ecosystems are	Directors must consider;

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
what process is used to determine the quantity of water available for consumptive use?	including temperatures. Requirements for sustaining riparian vegetation. Commitments to licensed and other water users in Alberta and downstream	included in licences, approvals or permits. Applications for licences or approvals on "sensitive steams" may be accepted subject to appropriate mitigation measures or may be refused.	application to the Minister responsible for the Environmental Management and Protection Act where the SWA is of the opinion that proposed works may	protected and maintained. Process takes account of the full range of riparian and ecosystem values including fish. IFN levels established for the Assiniboine and licence terms and conditions may prescribe minimum flows.	Natural functioning of the ecosystem Water availability including water balance, existing users, low water conditions, whether the taking is in a high or medium use watershed, planned and approved municipal water use.
What priority if any is assigned to water for instream or environmental purposes/	Minimum flow requirements can have higher priority than licensed allocations where there are terms and conditions in these licences. Otherwise, priority is based on date of allocation for instream purposes.	Licence issued for streamflow protection has priority over all junior licences. Terms and conditions related to protecting fish and fish habitat take precedence over right to divert.	The Act does not specify a special priority for any form of licence; but no new licence may be issued for water allocated to the use of another person or reserved from allocation. Instream flow issues are dealt with through licence terms and conditions that take account of the variable nature of prairie streams. Conditions may require operators to meet minimum flow requirements or to meet a particular objective. For example, the conditions for the Duncairn facility require the operator to maintain sufficient flows to permit the continued operation of the Swift Current municipal water works.	The priority of an instream flow licence would follow the usual rules but as a matter of practice the Department does not issue licences fro IFN purposes. In addition the rights of any other licensee might be suspended or restricted in order to ensure that aquatic ecosystems are protected and maintained	A Director must consider environmental requirements when issuing a permit, as well as water availability, including water balance, existing users, low water conditions, whether the taking is in a high or medium use watershed, planned and approved municipal water use.

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
Rights to Take and Use Water					
How does the system allocate water to individual water users? (List all that apply)	Household users can simply take up to 1,250 m^3 per year without requiring a formal allocation. RIparians who used water prior to January 1, 1999 for raising animals or applying pesticides to crops are allowed to continue to use up to 6,250 m^3 for these purposes (exempted agricultural users (EAUs)). Farmers also had a three-year period (199 to 2002) to apply for a registration that allowed withdrawals of up to 6,250 m^3 for agricultural purposes (traditional agricultural user (TAU) Other users are required to obtain a licence or registration that establishes a maximum volume. The regulations allow other exemptions from licence requirements for purposes such as diversions of produced water or small amounts for camps or agricultural purposes.	For long term (greater than 12 months) diversion or use, water is allocated through licences. For short term (less than 12 months), approval may be granted without issuing a licence. It is not an offence to use unrecorded water for domestic purposes, mineral prospecting or firefighting. Registrations are issued to people who are allowed to remove water from BC.	Licences. Licences may be issued for: domestic, wildlife, municipal, recreation, irrigation, industrial, multiple or other A Term Water Rights Licence is required for industries using water for temporary processing operations including: mineral exploration and mining, oil exploration and recovery, manufacturing, gravel washing, road construction, hydraulic pressure testing, thermal power generation and other purposes the SWA may designate. Persons using or occupying land that adjoins a surface body of water Pre-existing rights under earlier legislation	Principally by way of a licence. In addition, under the domestic use exception up to 25 000 L per day can be used for domestic purposes (household and sanitary purposes, and for watering lawns, gardens, livestock and poultry)	Water users must acquire a permit to take water (PTTW) if taking more than 50,000 litres per day. Exceptions are domestic purposes and watering livestock or poultry, firefighting, and grandfathered wells, intakes and structures operating prior to March 30, 1961. With proposed legislative amendments, there will be a 379,000 litres per day threshold for livestock, above which users will be required to obtain a PTTW. Currently in Ontario there are no takings as high as 379,000 litres per day.
How are different types of water users defined? What are the triggers?	The four types of rights are defined in terms of volume thresholds, purpose (household, agricultural, or other) and relative priority	Water users are defined according to purpose and for duration of use (less than or greater than 12 months). Definitions of nine purposes are included in the Water Act, including conservation, domestic, industrial, irrigation, land improvement, mineral	Domestic users do not require approvals for works provided that work is a dugout or a pump used to fill a cistern, trough etc and no more than 5 cubic decametres	The different types of water rights are defined either by the volume or the purpose of the use or diversion, or both. 'Agricultural purposes' is defined by volume (more than 25 000 L per day) used for primary agricultural products,	Permits are required for all types of use. Types of water users are defined by purpose e.g irrigation (includes crops and golf courses, etc), commercial, industrial and municipal. Private domestic uses, firefighting and direct watering of livestock are

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
		trading, mining, power, and storage. A streamflow protection licence may also be issued for fish and fish habitat. *Water Protection Act* defines registrations		but not irrigation. 'Domestic purposes' is defined by volume (less than 25 000 L per day), see above. 'Industrial purposes' is not defined by volume. It is water used for operation of industrial plant producing goods or services. 'Irrigation purposes' is defined by volume (more than 25 000 L per day), used for supporting plant growth. 'Municipal purposes' is not defined by volume. It is water used for municipal or community water distribution system for household or sanitary purposes, for industrial use and other uses within communities.	exempt from having to obtain PTTW) and volume threshold.
What rights does each type of water users have to take and use water?	Household and exempted agricultural users can take water up to the maximum volume at any time of year, at any rate, from any sources. TAUs and EAUs can divert or withdraw water from their traditional sources. All licenced and registered users must use water in accordance with the terms and conditions in their allocations.	All licenced or approved water users have the rights to divert and use a specified quantity of water from a specific water body for a specific purpose on a specified parcel of land within a specified time window. They also have the right to received 6 months written notice from anyone proposing to alter or interfere with their authorized works and to file an objection if they feel their rights would be affected by a subsequent water licence being issued upstream.	The rights are specified in the individual licences and not in the Act.	Use of water for domestic purposes is only restricted by volume (25 000 L per day). Licence holders are restricted by the terms and conditions of their licences.	Exempted users do not need PTTW, unless the Director decides that exempted takings interfere with any private or public interest in water and that a permit is required.
How is priority among water users addressed?	Household uses are considered highest priority; all other licenced or registered users have priority among themselves within the basin	Priority is based on licence issue date. However, where licences are issued on the same date from the same stream they have priority	The Act does not specify a special priority for any form of licence; but no new licence may be issued for water allocated to the use of another	The priority of a licence is based upon the date of submission of an application. Where two licences have the same temporal priority, a	Exempted users do not need a permit, all other uses require a PTTW. All PTTWs have equal priority. The Ontario Low Water

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
	based on the priority date of their allocation. Exempted agricultural users and other exempt diversions have no priority.	among themselves according to purpose (highest to lowest): domestic, waterworks, mineral trading, irrigation, mining, industrial, power, hydraulicking, storage, conservation, conveying and land improvement.	person. Priority is an issue in the water short areas of SW Sask with variable prairie stream flows; water is in practice allocated by the operator of the control structure on a "share the shortage" basis rather than on the basis of prior appropriation. Pre-1984 Senior rights holders have not challenged this approach.	licence has precedence according to the following list in descending order: domestic, municipal purposes, agricultural purposes, industrial purposes, irrigation purposes and other purposes.	Response program responds to water shortages within watershed boundaries, based on the degree of severity. Under a Level I condition (potential water supply problem), the conservation authorities, communities and other key provincial agencies coordinated by a water response team (WRT) use communication tools to emphasize voluntary water conservation (10% reduction). Under a Level II condition (potentially serious problem), the WRT will implement use communications and impose restrictions through municipalities on non-essential use (additional 10% reduction). For Level III conditions (failure to meet demand) the OWDC Low Water Committee will develop a response that may include water use restrictions on a range of small and water users, based on some knowledge of the social, economic and environmental impacts of low water and recommendations on priorities for these restrictions and other reduction activities. Priority will be described in terms of essential, important, non-essential.
Does the system convey different rights to different types of water users? If so explain.	The right to divert water for household users is different from the right to divert water as set out in the terms and conditions of licences and registrations. Licences issued prior to Water	All licences and approvals are treated equally, subject to unique terms and conditions in each licence or approval. It is not an offence to use unrecorded water for domestic purposes, mineral prospecting	Rights are specified in licence terms and conditions.	The right to use water for domestic purposes is different than the rights to use water for other purposes.	No. If in the opinion of the director a taking without a permit interferes with any public or private interest in any water, a Notice can me issued under s. 34 of the OWRA prohibiting the taking without a

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
	Act generally had no expiry date; licences issued since have an expiry date.	or firefighting.			permit. The taking in question can then be handled in the same manner as takings normally authorized by permit.
Does the system convey different responsibilities to different types of water users? If so explain.	Licences and registrations may contain terms and conditions that impose different responsibilities. For example, some licences have requirements to report water use; others may have cut-off dates or minimum flow restrictions.	Licences and approvals may contain terms and conditions that impose different responsibilities. General responsibilities include: operating within terms and conditions, accepting responsibility for damage cause by works, provide records of water use and diversion, and Pay annual water rental invoicest	SWA may issue water rights licence to any person for any term it considers appropriate and subject to any terms and conditions it considers appropriate	Licences may contain terms and conditions that impose different responsibilities. Also, licensees have the obligation to use or divert the water. If they fail to use or divert the water to the extent authorized by the licence for a one year period, the licence may be amended or revoked.	Permit holders have terms and conditions that they must comply with, including data reporting. Exempted water users do not face similar conditions. However, if in the opinion of the director a taking without a permit interferes with any public or private interest in any water, a Notice can me issued under s. 34 of the OWRA prohibiting the taking without a permit. The taking in question can then be handled in the same manner as takings normally authorized by permit, including condition and reporting.
Is each type of user limited in their use of water to: • a specific purpose? • a total volume of diversion? • a total volume that can be used? • a specific time for diverting? • a rate of diversion? • a specific water source? • a specified	Except for exempt produced water and exempt manually pumped groundwater, all users are limited in terms of purpose and the total volume of water that can be diverted for use. Except for certain regulatory exemptions, all users are limited by volume of diversion or by acreage (irrigation). Licences generally do not differentiate between what can be withdrawn and what can be used. Some licences contemplate a return flow. We assume all licences and registrations specify a maximum rate of diversion from a specific source at specific location. Household	All users are limited in terms of purpose and the total volume of water that can be diverted for use. Licences do not differentiate between what can be withdrawn and what can be used. All licences and registrations specify a maximum rate of diversion from a specific source at specific location for a specific use on a specific parcel of land. Some licences may have cut off times or other restrictions that can limit when they can take water	Neither the Act nor the regulations impose any such limitation but such limitation might be included in the terms and conditions of the licence by the SWA. By policy certain licences are issued for industrial use purposes.	The different rights are defined by purpose of the use or diversion (see above). Most licences contain terms and conditions that limit the purpose for which the water can be used, the location it can be diverted from, the annual withdrawal rate and the maximum amount of water used annually. Most licences are issued for terms of up to 20 years. These vary between licences. Some licences (e.g. for "escarpment streams") limit off channel diversions to spring run-off months	All users are limited in terms of purpose and the total volume of water that can be taken, Transfers oof water our of Ontaio's three major basins (Great Lakes – St. Lawrence, Hudson and Nelson) are prohibited with some exceptions. Listed in OWRA. Permits can specify consumptive use and return flow requirements, including location and manner of return flow. Permits specify a maximum rate of diversion from a specific source at specific location using a specific manner of taking. Permits are issued for a fixed period of time. Permits may limit time window for

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
diversion location?	and exempt agricultural users are limited to a source and volume but not to a rate of diversion or location. Some licences may have cut off times or other restrictions that can limit when they can take water				withdrawals. Section 53 of OWRA requires approval to establish, alter, extend or replace new or existing sewage works, including any works for the collection, transmission treatment and disposal of sewage. Sewage includes drainage, storm water, commercial and industrial wastes, and other substance specified by regulation.

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
Process of Acquiring Rights to Take and Use Water					
What is the process by which water users obtain the right to use water?	People requiring water for purposes other than household use or other users exempted in the regulations must submit an application to Alberta Environment.	People requiring water must submit a completed application to regional water manager.	Persons wishing to obtain a water rights licence must file an acceptable application, pay a prescribed fee, provide any plans required by the SWA; and any other information that the SWA may request	Everyone applying for a licence (not using water for domestic purposes) must submit an application to the Minister, pay the prescribed fee, and include all plans, documents required. See Manitoba Water Stewardship website for details.	Anyone taking more than 50,000 litres of water/day, and the pump in-takes or the works were installed or constructed after March 1961 must apply for a "permit to take water". Takings that are exempt, regardless of the date of construction or the amount of water taken, are as follows: • takings by individual for ordinary household purposes; • takings for direct watering of livestock; • takings for firefighting Proposals for new or increase takings that remove water from high use watershed are refused. Proposals to increase diversion or consumption for the Great lakes basin above a specified threshold require prior notice and consultation under the Charter. There are three types of PTTW. Category 1 – Renewals, ponds <1,500 m^3 in volume that collect run-off. Category 2 – Water from Great Lakes or connecting channels below threshold (379,000 l/d), taking from sources with previous assessments, rivers and streams <5% of 7Q10,

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
					transitional with previously required upgrades, takings or returns with no major changes in quality or quantity, and lakes and ponds with takings <1Million L per day, twice per week from small (>10ha) offsteam water bodies. Category 3 – All others.
What factors are considered before an allocation can be issued?	Director must consider any applicable approved water management plan and may consider any existing, potential or cumulative effects on the aquatic environment, hydraulic, hydrological and hydrogeological effects, and effects on household users, other licensees and traditional agriculture users, hat result or may result from the diversion of water, operation of a works or provision or maintenance of a rate of flow of water or water level requirements, and may consider effects on public safety, with respect to irrigation, the suitability of the land for irrigated agriculture, and any other matters applicable to the licence that in the opinion of the Director are relevant, including any applicable water guideline, water conservation objective and water management plan.	Water manger must consider any applicable approved water management plan (including the Columbia Basin Management Plan); potential impacts on existing licence holders or earlier applicants, minimum instream flow requirements, landowner or Crown land tenure holders, other agencies and the interests of First Nations; and any objections received. There must be a determination of whether sufficient water is available.	The SWA does not provide a list of factors to consider before granting a licence to use. SWA will evaluate an industrial use application and consider scarcity of the water supply, impacts to adjacent water users, purpose of the water use and quality of the source water. A licence may be denied if adverse impacts are identified or the source of water is inappropriate. Applications for approvals of works may be referred to the Minister responsible for EMPA. Before granting an approval for works the SWA will: determine the availability of water at the point of diversion; identify any adverse watershed effects which may require special operating conditions; assess and classify any proposed dam or structure for safety, hazard, or impact; verify landownership and control; and identify any other requirements for the proponent to complete.	The WRA requires that the Minister must consider scientific and other information relating to the groundwater and water body levels, and the in-stream flows, in order to ensure that aquatic ecosystems are protected and maintained.	Director must consider the following: • Natural functioning of the ecosystem (water flows and level, in stream flow, habitat, ground and surface water relationships, impacts on water quality and quantity) • Water availability (water balance, existing users, medium or high use watershed, approved municipal water use plan) • Use of water (whether BMP is being followed by relevant sector, purpose of use, likelihood of use) • Other issues (interest of other parties, any other matter considered relevant) Different categories of PPTWs are required to provide different information at time of application and different tests are applied. Category 1 – no additional work or studies required but terms and conditions to prevent serious interference with other users and to minimize environmental effects. Category 2 – Scientific review by a qualified persion and

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
					audits may be undertaken. Category 3 – required to submit scientific studies with scientific review by the Ministry. Ministry may consult with other agencies. Applicant and Ministries may be required to consult with municipalities, conservation authorities (or DFO), and Ministry of Natural Resources.
Are there requirements for public notification in the process of acquiring rights?	Yes. As set out in regulations. Interested parties can submit a statement of concern within a specified period and the Director must consider those concerns and give notice of the decision to everyone who submitted a statement.	Yes, a licensee, riparian owner or application for a licence who considers that their rights may be prejudiced by granting of an application can file an objection within a specified period. The comptroller or water manager can decide whether or not to hold a hearing and must nifty all parties of that decision, and then notify all parties of the decision if a hearing was held.	The SWA does not require public notification before granting a licence. It does require public notice of an application for approval of works unless waived by the SWA..	The Minister may direct the applicant to publish a notice of application in a newspaper circulated in the area affected if there is sufficient reason to warrant it. The published notice of application must state the nature of the licence applied for, that any person wishing to object may do so within 15 days and any other information that may be required. After the 15 day period the must be a public hearing before the Municipal Board where any person make applications for or against the application. There have been no such hearings in the last number of years. A hearing is more likely to be triggered by the application of the Environment Act. The hearing would be held by the Clean Environment Commission	Notice is give to the conservation authority and municipalities in which the water taking is to occur. Other people and agencies and conservation authorities outside the location of the water taking may be provided notice at the discretion of the Director, where the taking my impact another water taking or have a related adverse environmental impact. Notification is done by posting the information on the Environmental Registry and notifying parties by mail, fax, e-mail or in person. Proposals for permits applications are posted on the Environmental Bill of Rights (EBR) registry for a minimum 30 day public comment period. Decision Notices are posted once a decision in made.
Is there an opportunity to appeal the issuance of a	Decisions can be appealed to the Environmental Appeal Board by persons who are directly affected. Where a	Decisions can be appealed to the Environmental Appeal Board	There is no right to appeal the issuance of a water right; there is only a right to make submissions in the event of	Any person who is affected by an order or decision may appeal to the Municipal Board	Three types of appeals are possible. An applicant or permit holder always has the right to appeal. Third parties

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
water right and who can initiate an appeal?	notice of application was given, to appeal a person must have filed a statement of concern.		cancellation, amendment or suspension.	within 30 days. There have been no such appeals in the last number of years.	can initiate appeals of decisions of two types of PTTWs. All permit proposals (with the exception of irrigation of crops) are posted on the registry). Appeal by first seeking leave to appeal to the Environmental Review Tribunal (ERT). Appeals to Minister can be initiated once the ERT has made its decision. Conservation Authorities, who are tasked with stewardship of local watersheds, have, in the past, filed objections to PTTW issued from their watersheds.
What is process by which a water entitlement can be amended?	A Director has limited power to amend for some purposes (but not to increase an allocation) and a licensee can seek an amendment of any part of the licence.	Subject to providing notice, considering objections filed, and providing notification of the decision, a water manager has power to make following amendments: • authorize use of water for some purpose other than that specified in the licence; • extend the term of licence; • increase or reduce the quantity of water authorized if it appears to have been erroneously estimated; Licences may also be amended to reduce allocations to provide additional water for fish or fish habitat as specified in an approved water management plan, with no opportunities for appeal.	The Act does not deal with amendments on the application of a licensee. However, as a matter of practice a license may apply to change the terms and condition of a licence (e.g. point of diversion). Such an application will be dealt with in the same way as an application for a licence. Where the SWA proposes to amend the licence on its own motion the SWA must give the holder of the licence written notice of its intention to amend, and the holder 30 days from the date of notice to make written representations as to why the licence should not be amended. After receiving the representations the SWA has to provide a written decision to the holder of the licence.	The Act does not directly address applications from licensees to amend point of diversion etc but in practice the Department follows the same process as on the initial application. Licensees also supposed to apply for amendment when land transferred. The Minister may restrict or suspend the rights under licence if (based on scientific information) there is insufficient water to ensure that aquatic ecosystems are protected and maintained. If the licensee fails to use the water the Minister may be amend the licence to reduce the amount of water that may be used.	A Director has the authority to amend or revoke a permit and alter terms and conditions of a permit after it has been issued.

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
Other Questions					
Do water users have to pay an administrative fee to acquire water rights?	A small administrative fee is paid when applications of registrations are submitted	A small administrative fee is paid when applications of registrations are submitted. The fee depends on the purpose and volume.	There is a prescribed fee that must be paid upon application Application fees for different licences 0 - 500 dam^3 = $100 501 – 1000 dam^3 = $200 > 1001 dam^3 = $300 Reissue of water rights – to be determined by the volume of annual use	$50 per application.	A fee is paid upon permit renewal every 2-10 years, depending on use, and ranges from $750 to $3,000 based on cost recovery
Do water users have to pay an annual or other type of fee to use water? Is this related to the volume of water actually used?	There is no annual fee for water use.	All licensees are required to pay an annual fee. Rental rates vary by purpose and volume, but have a minimum annual fee. Licensees with small allocations may be required to pay once every three years, and more frequently for larger volumes. Fees relate to size of allocations not actual use.;	Yes. The fee for industrial water use is set out in the Regulations. The fee varies depending on location and volume of water used for industrial. These fees do not apply to agricultural or municipal uses, or water with TDS greater than 4000 mg/L obtained from the Blairmore or deeper formations.	An annual fee is required for licences issued for industrial purposes. This fee varies based on volume of water diverted. See regulations for rates.	Currently, there is no fee, however, a proposal to charge volumetric fee on the actual water use has recently been proposed. The proposal calls for charges to be levied on commercial and industrial water users who withdraw more that 50,000 litres per day and would be volume based.
Do water users have to report their annual water use?	Some of the larger municipal and industrial users are required to submit annual reports. This is being expanded.	Licensee are required to keep any records as required, including annual diversions and water use. They may be required to submit this information when required to do so in order to provide compliance with the licence terms and conditions and to demonstrate beneficial use (water used for three prior years).	Neither the Act nor the regulations require reporting. However, all licence terms and conditions (with the exception of domestic use licences) require measuring and reporting.	All licences contain a clause which stipulates that records of water use must be kept and forwarded to the Water Licensing Branch. Depending on the type of project records must be kept either daily, weekly or monthly. In practice the Department maintains good records for industrial users (because of the fee implications) but less complete for other users.	All permit holders have to collect and record water taking data daily. Annual reporting of the collected data is required.
What methods do regulators use to monitor water	Complaints based system based on seniority. Regulators also monitor flows where there are minimum requirements (i.e.	Licence or approval holders may be required to install, operate, maintain and provide streamflow data. Otherwise,		All licensees must install either a meter or a timing device on the water source to measure	Water use is monitored using water meters and all permit holders are required to install appropriate monitoring

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
use?	Apportionment)	need for regulation appears to be complaint driven.		water use.	system(s).
What tools do regulators have to enforce the legislation related to water use?	Licences and registrations can be suspended or cancelled if there is a serious breach of terms and conditions or the rights issued under the licence have not been exercise for three years and there is no prospect that diversions will resume	Licences and registrations can be suspended or cancelled if there is a serious breach of terms and conditions or the rights issued under the licence have not been exercise for three years	The SWA may cancel, amend or suspend a water rights licence without compensation if the holder of the licence agrees, if the holder of the licence fails to comply with a term or condition of the licence or contravenes any provision of this Act, the regulations or any order; or defaults on payment. Offences and penalties under ss. 90, 92 of the SWAA, 2005.	Licences can be suspended or cancelled if there is a breach of a condition in the licence. Also anyone who fails to comply with a provision of the Act or regulations or a condition of the licence can be charge with an offence and is liable to a fine of $10 000 or to imprisonment of not more than 3 months, or both. The fine is $25 000 when the person is a corporation. There is a two year limit to be charged with an offence. In practice these powers have not been used in relation to water licences but have been in relation to drainage issues. Officers in the Department will shortly have the power to ticket and issue set fines.	In case of a perceived contravention, provincial officers may issue order that identifies the perceived contravention and my provide direction as to how this should be addressed. Permits can be amended or revoked.

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
Inter-Basin Transfers					
Does the legislation allow water to be transferred from one major basin to another?	A licence shall not be issued that authorizes the transfer of water between major river basins in the Province unless the licence is specifically authorized by a special Act of the Legislature.	Further licences shall not be issued that authorize the large scale transfers of water between major watersheds in the Province A large-scale project is a project that diverts or extracts 10 cubic metres per second of water or more, excluding projects that were already built or were under construction when the *Act* was proclaimed	The Act prohibits the granting of licences to transfer water out of a watershed – however, this does not apply to water that is transferred between watersheds or portions of watersheds within Saskatchewan. Saskatchewan needs to preserve some flexibility simply because Gardiner Dam and Lake Diefenbaker provide 40% or more of the population with potable water and need to be able to respond to future demands including industrial demands. The South Saskatchewan project allows South Sask water to be diverted into the Qu'Appelle River.	The WRA is subject to the WRCA. Subject to minor exceptions the WRCA prohibits removal of water from: (1) the HB basin, and (2) from a sub-basin. Further exceptions may be created by regulation.	Water transfers out of a basin is not allowed, with some exceptions (see below)
How is major basin defined? • Hierarchy? • Size? • Between drainage areas? • Cross-border considerations?	Major river basins are defined in the legislation and are generally consistent with the major drainages adopted by the Water Survey of Canada. Specific sub basins in the S. Sask. were not considered major basins because they are collectively managed for Apportionment purposes and because inter-sub-basin transfers already occur.	Major basins are defined in the legislation and are generally consistent with the major drainages adopted by the Water Survey of Canada. They include: the Fraser, the Mackenzie, the Columbia, the Skeena, the Nass, the Stikine, the Taku, the Yukon, and the Coastal watershed (all others)	Various provincial policy statutes and documents use different terminology e.g. watershed and basins The Discussion Guide for Conserving our Water lists some 13 major hydrological basins but the accompanying maps describe 15. Watersheds are used for planning purposes for source water protection. The Act does not define water basin, major water basin or watershed.	The WRCA defines "water basin" as the Manitoba portion of the Hudson Bay drainage basin. This covers all of Manitoba. The WRCA defines a "sub-water basin" as a part of the Manitoba portion of the HB drainage that is designated as a sub-water basin in the regulations. There are no such regulations under the WRCA. Policy documents describe: (1) the HB drainage basin, (2) 10 sub-basins and (3) smaller watersheds and refer to the development of integrated planning at the basin,	Three major water basins are defined in the legislation: • The Great Lakes – St. Lawrence River basin • The Nelson Basin • The Hudson Bay Basin

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
				watershed and local levels.	
For what purposes are inter-basin transfers allowed?	Can be for any purpose.	Can be for any purpose. Historically they have been for hydroelectric power production	Diversion of water from one basin to another has been undertaken primarily to alleviate water shortages in some areas of the province and for a variety of purposes including: (1) irrigation, (2) municipal, (3) hydro, (4) industrial (e.g. potash) and (5) recreation	Power Manitoba Water Policy 3.5 provides that the transfer of untreated water across the continental divide (in or out of Hudson Bay shall be opposed. Transfers within the HB drainage area shall be minimized and only considered after a complete assessment of the environmental, social and economic impacts of the donor and receiving basins.	Exemptions to interbasin transfers include: • Water transported in a container having volume of 20 litres or less; • Water used during transport • Transfers that commenced prior to January 11998 • Water transported to Greater Winnipeg Water District.
Are there limits on the volume of water or distance that water can be transferred?	No volume limits. No distance limits except that transfers outside of Canada are not allowed except for municipally processed water. Each application is evaluated on its own merit subject to tests in Water Act.	Must not have peak instantaneous flow of 10 m^3 or more per second	None prescribed in the legislation although licence terms would limit volumes.	The legislation does not impose limits although limits may be prescribed by licence terms and conditions.	Inter-basins transfers are prohibited.
What is the process by which inter-basin transfers occur?	Requires special Act of legislature and issuance of a licence. If the application involved a dam greater than 15 metres in height when measured to the top of the dam, a water diversion structure and canals with a capacity greater than 15 cubic metres per second, or a water reservoir with a capacity greater than 30 million cubic metres, an environmental impact assessment would be required and a review by the Natural Resources Conservation Board;	A water licence would be required	The process would be subject to the licensing scheme described above.	The existing Lake St Joseph Diversion was authorized by complementary legislation of Manitoba and Ontario An inter basin transfer from or to Hudson Bay is prohibited. A transfer from one major (sub) basin to another within Manitoba will only be prohibited when regulations are passed designating parts of Manitoba as sub water basins. The main existing diversion (Churchill\Nelson) was authorized under the terms of the Water Power Act. Any future diversion would	Inter-basins transfers are prohibited.

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
				likely trigger an assessment and hearing under the Environment Act.	
Is there a requirement to consult the public or other water users?	The Minister must consult with the public	As per water licence process, other licence and approval would have to be notified.	The requirement of new works would trigger the public notice requirement described above.	Except in the case of an emergency the minister must provide an opportunity for public consultation on the designation of sub-water basins.	Inter-basins transfers are prohibited.
What tests are used to determine whether an inter-basin transfer is allowed?	Depends on public input and commitments to other licenced users. Application must also meet test for issuing a licence as noted previously:	Effects on Water manger must consider any applicable approved water management plan (including the Columbia Basin Management Plan); potential impacts on existing licence holders or earlier applicants, minimum instream flow requirements, landowner or Crown land tenure holders, other agencies and the interests of First Nations; and any objections received. There must be a determination of whether sufficient water is available.	Interbasin diversions should only be considered where a surplus supply of water exists, where the net benefits to be derived are greater in the receiving basin than in the donor basin, and where other alternatives are not feasible. Evaluations of projects must include an examination of the potential for interbasin transfer of biota and suitable mitigation, since connecting two formerly separate watersheds could allow the introduction of parasites, new fish species and other organisms into new ecosystems	Manitoba Water Policy 3.5 indicates that diversion works within and between some if the watersheds within the Hudson Bay drainage basin have "resulted in substantial social and economic benefits to Manitobans"	Inter-basins transfers are prohibited.
What conditions are put on approved transfers?	Conditions are unique to each licence.	Unique to each licence	Volume	Conditions in the Churchill/Nelson interim licence include: (1) minimum levels in storage reservoirs, (2) maximum flows in the Burntwood River, (3) prescribed minimum flows during open water and ice cover periods below Missi Falls or "such greater releases as may be required for the needs of downstream interests ... as ordered by the Minister" (4) Ministerial approval required for schedule of releases, and (5) limitations on ramping	Inter-basins transfers are prohibited.

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
				rates. The 1973 licence is still an interim licence and the Final Licence "shall be issued subject to the regulations then in force and shall embody such matters as the Minister may determine in accordance with the regulations". The legislation and agreements for Lake St. Joseph include: (1) sharing of incremental energy produced, (2) maximum flows in the Winnipeg River, (3) measurements of discharge rates and elevations, and (4) indemnity arrangements.	
Have any such approvals been issued? How many?	Since the Water Act was introduced two licences were issued to take water from the S. Sask basin to the Battle basin (N. Sask) for municipal purposes.	BC has 9 inter-basin transfers that allow 361 cubic metres per second	There are many different approvals associated with and aspects of the South Saskatchewan project including the Saskatoon-South East Water Supply System. The original licence issued for SSEWSS provided an allocation of close to 60,000 AF (including an amount for reservoir evaporation) which it then allocated as follows: municipal, 2,185 AF, Industrial, 9,300 AF, irrigation, 32,800 AF, recreation, 9,200 AF and wildlife 4,000AF	Yes. The most significant is the Churchill\Nelson diversion. Another is the diversion from Shoal Lake to the Red River via the City of Winnipeg Aqueduct. A third is the Lake St. Joseph Diversion. Interviewees did not identify other diversions. Manitoba is also the (unwilling) recipient of a transfer from Devil's Lake (an HBC sub-basin) in North Dakota via the Sheyenne river. Manitoba has not approved of this diversion.	Ontario has 9 inter-basin transfers that allow 564 cubic metres per second
For what purpose(s) have transfers been allowed	Municipal water supply	Hydroelectric	The South Saskatchewan Project serves multiple purposes including irrigation, power, municipal, and industrial purposes.	Power generation (Churchill\Nelson & Lake St. Joseph) Municipal water supply	Hydroelectric purposes
How do inter-basin transfers	Licence issued for transfer has priority date that is considered	Licence issued for transfer has priority date that is considered	This has not been an issue given the overall approach with	Not an issue in the context of the above diversions.	Inter-basins transfers are prohibited.

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
affect priority of use between the two basins	in context of donor basin.	in context of donor basin.	respect to priority described above.		

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
Intra-Basin Transfers (Within Major Basins)					
Does the legislation allow water to be transferred from one part of a major basin (sub-basin) to another?	There is nothing in the Act that prohibits intra-basin transfers. There are a number of examples where intra-basin transfers have occurred (Bow to Oldman, Bow to Red Deer). A licence would be required.	There is nothing in the Act that prohibits intra-basin transfers. A licence or approval would be required.	The legislation does not preclude an intra-basin transfer	The WRCA will only prohibit transfers between the 10 major sub-basins if regulations are passed recognizing these as sub-basins for the purposes of the WRCA. Until that time WRCA permits transfers from one major sub-basin of the HB to another.	The legislation has recently been amended to prohibit intra-basin transfers between Great Lakes watersheds, as part of the Great-Lakes – St. Lawrence River Basin Sustainable Water Resources Agreement of 2005. Permits will not be issued for new or increased transfers of water between watershed above specified threshold amounts
How is each sub-basin defined? • Hierarchy? • Size? • Between drainage areas? • Cross-border considerations?	There is no definition. A sub-basin can be anything less than major river basin as defined in the Act.	There is no definition. Likely to be any sub-basin that lies within one of the province's nine major watersheds. Probably follow Water Survey of Canada definitions?	The legislation does not define sub-basins. See the policy documents referred to above.	See above.	The legislation defines five Great Lakes watersheds: o Lake Superior watershed o Lake Huron watershed o Lake Erie watershed o Lake Ontario watershed o St. Lawrence watershed.
For what purposes are intra-basin transfers allowed?	Could be for any purpose. Depends on nature of licence application.	Could be for any purpose. Depends on nature of licence application.	As above for inter basin transfers.	Transfers within a basin may be allowed for municipal water supply purposes.	Transfers for municipal drinking water purposes are allowed as long as the new or increased transferred amount is always less than 19 million litres per day and other conditions apply (see below). Transfers for other purposes are allowed as long as the new or increaser amount to be transferred is less than 379,000 litres per day.

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
Are there limits on the volume of water or distance that water can be transferred?	Could be for any amount, subject to commitments to other users, licensees, conservation objectives or Apportionment Agreement.	Could be for any amount.	No.	The legislation does not impose any such limits.	Transfers for municipal drinking water purposes cannot exceed an average of 19 million litres/day and are allowed if, water is to be used to serve a major residential development, or conservation is not an option, there are not feasible alternatives, notice is given to other signatories of the Agreement, water is returned to the same source watershed, the amount is reasonable, there are not significant or cumulative adverse impacts on water quality or quantity in the basin, employs appropriate water conservation measures, and is consistent with existing treaties and agreements related to boundary waters. Transfers for all other uses cannot exceed 379,000 litres/day
What is the process by which intra-basin transfers occur?	Applicant would submit a licence application. If the application involved a dam greater than 15 metres in height when measured to the top of the dam, a water diversion structure and canals with a capacity greater than 15 cubic metres per second, or a water reservoir with a capacity greater than 30 million cubic metres, an environmental impact assessment would be required and a review by the Natural Resources Conservation Board;	Applicant would submit a licence application.	The process would be subject to the licensing scheme described above.	An intra-basin transfer would be subject to the same licensing provisions described above and would likely trigger an assessment and hearing (by the CEC) under the Environment Act.	Any transfer requires a permit to take water, with the exception of water in small containers and for emergency pruposes. Any dams, diversions are subject to *Lakes and Rivers Improvement Act*. This Act specifies the types of projects that require approval.
Is there a requirement to consult the public	As per any licence application. See previous.	A notice of licence application must be published for a public comment. A licensee, riparian	The requirement of new works would trigger the public notice	Yes; as above.	Notice of applications for permits to transfer water between watersheds must be

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
or other water users?		owner or another applicant whose rights would be prejudiced can file an objection.	requirement		given to other signatories of the Agreement (Quebec, Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Wisconsin and Pennsylvania). Any of the signatories can request a hearing by a tribunal which has the power to confirm, alter or revoke a decision and provide additional direction as required.
What tests are used to determine whether an intra-basin transfer is allowed?	As per any licence application. See previous.	Effects on Water manger must consider any applicable approved water management plan (including the Columbia Basin Management Plan); potential impacts on existing licence holders or earlier applicants, minimum instream flow requirements, landowner or Crown land tenure holders, other agencies and the interests of First Nations; and any objections received. There must be a determination of whether sufficient water is available.	As above for inter basin transfers.	The same tests as applied to any licence application. The Minister would have to take account of instream flows and ensure that aquatic ecosystems are maintained.	Tests are set out above.
What conditions are put on approved intra-basin transfers?	As per any licence. See previous.	As per any licence. See previous.	As above for inter basin transfers.	The same tests as applied to any licence application. The Minister would have to take account of instream flows and ensure that aquatic ecosystems are maintained.	
Have any such approvals been issued? How many?	9 for 117 cubic metres per second.		Yes.	See above.	
For what purpose(s) have intra-basin transfers been allowed	Irrigation and other purposes.		A broad range of uses including municipal and industrial.	See above.	

PROVINCE:	Alberta	British Columbia	Saskatchewan	Manitoba	Ontario
How do intra-basin transfers affect priority of use between the two sub-basins	Licence issued for transfer has priority date that is considered in context of major river basin.	Priority based on precedence date in licence within major watershed..	Not an issue given the overall approach with respect to priority described above.	See above.	

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
Legislative Overview					
Type of water rights system: Riparian Prior allocation Prior appropriation Hybrid	Tennessee has a riparian system of water rights and non-riparian use of water is prohibited, except by municipalities.	North Carolina has a riparian system of water rights.	Hybrid; older riparian rights overlain by a prior allocation scheme (by permit) with a domestic use exception. Also accommodates rights acquired by prescription (pre 1973)	Prior appropriation, however a permit is needed to make an appropriation. The state instituted its permit system in 1919. Riparian rights are not recognized In Arizona, the main source of water is groundwater and so it must be discussed, at least marginally, even though this report does not focus on groundwater. Groundwater is regulated in accordance with the "reasonable use" doctrine, not prior appropriation. Under the 1980 *Groundwater Management Act* 4 active management areas (AMA) were established. In these areas withdrawals are limited to "safe yield" meaning no more can be taken out that will recharge over a given period. The rest of the state's groundwater (mainly rural) is not under an AMA.> Given many hydrological connections between ground and surface water the state has been urged to adopt co-management schemes. There are federal reserved water rights in respect of federal and tribal lands, which constitute about 70% of the state.	Prior appropriation , however, under the Constitution (Art. 16 § 6) the priority of appropriation gives better right among those using water for the same purpose, but "when the waters of any natural stream are not sufficient for the service of all those desiring the use of the same, those using the water for domestic purposes shall have the preference over those claiming for any other purpose, and those using the water for agricultural purposes shall have preference over those using the same for manufacturing purposes." Courts have interpreted this "priority" as only giving preferred users the right to condemn (expropriate) and pay compensation to less preferred water users.
List all pertinent legislation and	*Watershed District Act* (state)*t* *Water Quality Control Act*	*Water Use Act*(state) *Environmental Policy Act*	North Dakota Century Code (NDCC) title 61 (Waters)	Arizona Constitution, Article 17	State Constitution Article XVI §§ 5 and 6; C.R.S. § 37, arts. 80 - 92., and C.R.S. §§ 37-92-

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
regulations?	(state) *Inter-Basin Water Transfer Act* (state) *Tennessee Safe Drinking Water Act* (state) *Water Withdrawal Registration Act* (state) *Tennessee Valley Authority Act* (federal) *Clean Water Act* (federal) *Endangered Species Act* (federal)	(state) *Clean Water Act* (federal) *Endangered Species Act* (federal)	North Dakota Administrative Code (NDAC), 89-03 ND Constitution, Article XI(3) Little Missouri State Scenic River Act Yellowstone River Compact 1950 (MT, ND and Wyoming) Dakota Water Resources Act, 2000 National Environmental Protection Act, 1969 (NEPA)	Arizona Title 45 Arizona Department of Water Resources Administrative Rules, Title 12, Ch. 15. *Colorado River Basin Project Act of 1968*, U.S. Code Vol. 43, §1501 et sec. *Endangered Species Act of 1973*, U.S. Code, Vol. 33, § 1251 et seq. Arizona is a member of the Lake Mead Contract, Colorado River Compact, and Upper Colorado River Basin Compact.	101 through 37-92-602

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
In stream Requirements/Water Availability for Consumptive Uses					
How does the system determine how much water can be made available for consumption?	All water is available for consumption other than where restricted by water quality constraints on public water supply areas and in-stream flow.	All water belongs to the State and the State may make rules concerning the wise and beneficial use of the water. The Environmental Management Commission (Commission) may declare and delineate capacity use areas where it finds that use of water require coordination and limited regulation for the protection of the rights of residents or property owners of such areas or of the public interest.	"All flowing streams and natural watercourses shall forever remain the property of the state for mining, irrigation and manufacturing purposes" All waters in the state belong to the public and are subject to appropriation for beneficial use in accordance with Title 61 of the NDCC. Waters may only be used for beneficial purposes which is "a purpose consistent with the best interests of the people of the state".	Surface water resources are determined by a network of 270 streamflow gages that the U.S.G.S. operates.	N/A, under Colorado's Constitution "The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied." (emphasis added)
Are there limitations related to instream or environmental requirements and what is the mechanism for this?	State can veto federal licence for a project to protect water quality or aquatic habitat. Federal agencies must not jeopardize endanger species or destroy or seriously alter the species' habitat	There are no specific limitations or requirements, however, water withdrawals beyond certain volume from capacity use areas is subject to an environmental assessment process. That process determines if significant adverse environmental effects from a proposed withdrawal will occur. State can veto federal licence for a project to protect water quality or aquatic habitat. Federal agencies must not jeopardize endanger species or destroy or seriously alter the species' habitat.	The state engineer may, and on the direction of the Commission must, reserve and set aside waters for beneficial use in the future. Instream flows are protected to a limited extent in the Little Missouri through the Little Missouri State Scenic River Act	The Waters Act recognizes uses for "recreation, wildlife, including fish" as beneficial uses. Both government and private persons may hold instream flow rights. A mandate of the Arizona Water Protection Fund Commission (created under Chapter 12, Title 45-2103 RS) is to acquire water rights to enhance instream flow. Water held under an existing consumptive right may be transferred to or leased to private or public entity for instream purposes. An out of stream diversion is not required for a water right, and so permits may be issued	Common law and legislation recognize instream uses as beneficial uses. However, on the Colorado Water Conservation Board (CWCB) may appropriate water for instream uses. The CWCB also may acquire water rights to be put to instream use by grant, purchase, donation, bequest, devise, lease, exchange, or transfer. These appropriations require adjudication. However emergency, temporary "loans" of water rights for instream use do not require adjudication. As well municipal entities and water districts may apply for a "recreational in-channel diversion" which is, in effect, an instream water right.

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
				to protect instream flow.	
What factors are considered or what process is used to determine the quantity of water available for consumptive use?	Water withdrawals must not jeopardize water quality of water course which are designated as public water supply source. Any water withdrawals must not adversely affect the water quality.	Environmental assessment process determines the impacts of a proposed project. Determination of water available for consumptive use is dependent on that process.	The Code's declaration of State Water Policy does not refer to instream flows but notes that public health and welfare etc "depend ... upon the optimum protection and management, and wise utilization of all of the water and related land resources of the state."	No specific requirements identified, however, the director must consider whether a proposed right is contrary to the public interest.	N/A, under Colorado's Constitution (Art. XVI, § 6) "The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied." (emphasis added)
What priority if any is assigned to water for instream or environmental purposes/	In-stream flows have been calculated by the U.S. Army Corp of Engineers, however, these values are not explicitly taken into account when allocating water.	No specific priority assigned, however, Commission may define capacity use areas for public interest which could include priority for in-stream or environmental purpose.	The state does not issue permits for instream or environmental purposes; instream flow is not treated as a beneficial use. The ND Game and Fish Department holds numerous permits for wildlife and recreational purposes.	Post 1919 priority is based on the date of filing an application for a permit, prior to that it was the date of an appropriation being made under common law.	Prior appropriation governs except for any federal reserve rights. As limited as noted two boxes above, instream rights may be acquired from transfers of out of stream diversion, carrying the transferor's priority.

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
Rights to Take and Use Water					
How does the system allocate water to individual water users? (List all that apply)	Every riparian has equal right to use the water in the stream in a manner that does not damage other riparian without their consent. Water users whose average withdrawals are 10,000 gallons or more per day must register their withdrawal to the Department of Environment and Conservation, some exemptions apply.	Every riparian has equal right to use the water in the stream for a reasonable purpose in a manner that does not damage other riparian without their consent.	Permits Prescriptive Domestic users (no permit required)	A water right is established by appropriating water and putting it to a beneficial purpose, without waste, and with due diligence. Post 1919 rights require a permit.	Colorado is the only western state without a formal permit system for surface appropriations (groundwater appropriations are acquired by permits). The system does not allocate surface water rights. Users appropriate water and put it to a beneficial use, with due diligence, and without waste. Water courts, as explained elsewhere, decree (affirm) water rights.
How are different types of water users defined? What are the triggers?	Users are defined in terms of volume threshold and uses.	Users are defined in terms of volume threshold, uses, if located in capacity use areas, and if water transfer. Users whose withdrawals are less than 100,000 gallons/day have no requirement to register. Agricultural users whose withdrawals do not exceed 1 million gallons per day also do not need to register. Transfer of 2 million gallons or more per day, regardless of purpose, requires approval (certificate for transfer) from Environmental Management Commission. **Capacity use areas:** All withdrawals in excess of 100,000 gallons/day requires a permit, withdrawal less than 100,000 gallons/day does not require a permit.	All of the following uses are defined in NDCC 61-04-01 Domestic use Fish, wildlife and recreation Irrigation use Industrial use Livestock use Municipal or public use	Surface water rights (trigger - prior appropriation subject to the permit system); groundwater rights (trigger, need a permit except for exempt use, rights based on reasonable use subject to the *Groundwater Management Act* (discussed elsewhere), federal reserved rights; and effluent (gray water rights). Effluent rights relate to wastewater collected in sewers and treating to a level allowing some beneficial use (e.g. stockwatering, irrigation, not necessarily up to potable). There is case law that treated effluent is neither subject to appropriation nor groundwater rules, but it is state owned. However the state has not yet regulated effluent leaving it up to municipalities whether they "sell" treated wastewater. Some local governments even require that treated effluent, rather than "new" surface or	There are only surface water rights and groundwater appropriations. Groundwater appropriations are not discussed in this project. The trigger for a surface water right is accomplishing an act of appropriation described in the box above. A Court can, however, award conditional water rights, where the holder has not yet put the water to a beneficial purpose because the holder needs time to complete works or project etc. The holder must diligently pursue works/ project completion. Once completed a water court can decree the right to be an absolute water right.

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
				groundwater be used for golf courses.	
What rights does each type of water users have to take and use water?	Users whose withdrawals are less than 10,000 gallons per day have no requirement to register. Exempted users whose withdrawal exceed 10,000 gallons per day include: • Agricultural purpose (irrigation and livestock watering) • Nonrecurring water withdrawal • Withdrawal in emergencies involving human health and safety	All permit holders must comply with terms and conditions contained in their permits or certificate. For permits, the Commission must give 60 days written notice for modification or revoking	The rights are limited by the purpose of the application. See the definitions in the Code; "beneficial use" is "the basis, the measure, and the limit of the right to use water". An individual (as opposed to an irrigation district) may only apply for a permit for irrigation purposes for no more than 720 AF. This requirement does not apply to the Missouri. Water permits for municipalities may contain water in excess of present needs for reasonably projected future needs.	Diversions are for specific purposes and are subject to permit conditions. Effluent water must be treated and used in accordance with regulatory requirements.	Right to divert and put water to a beneficial use, with due diligence, without waste.
How is priority among water users addressed?	A riparian landowner has the right to reasonable use of water flowing past the property. All other users must obtain a registration to use the water.	A riparian landowner has the right to reasonable use of water flowing past the property. All other users must obtain a registration to use the water and have equal priority. **Capacity use areas:** In capacity use areas, the right to take water may be subject to the outcome of environmental assessment process but non consumptive water use is given higher priority than consumptive water use.	Priority generally based on the date of receipt of properly completed permit application. Priority for water applied for domestic, livestock, or fish, wildlife or other recreational uses without a permit is based on the date the quantity of water was first used. Where there are competing applications and inadequate supply the engineer shall apply an order of priority as follows: domestic, municipal, livestock, irrigation, industrial and fish\wildlife\recreational (but only with respect to applications received within any 90 period).	Once surface water has been put to a beneficial use to the satisfaction of the director, priority will be as at date of application. Superior courts adjudicate priority claims.	Although a water right arises as set out in the box immediately above, priority is established after a water right has been adjudicated. With conditional water rights, once the water has been put to a beneficial use priority will relate back to the time when the right was granted. Storage water rights also may relate back to date of the granting of the right.
Does the system convey different rights to different types of water	All riparian users have equal rights to the reasonable use of water. Non riparian users must first satisfy the conditions set	All riparian users have equal rights to the reasonable use of water. Non riparian users must first satisfy the conditions set	Rights for any permitted use are the same. Municipalities and rural water	Water permits and rights are held for particular uses. Federal reserved water rights	There are direct flow rights, and storage rights. Direct flow rights normally are diverted and directly put to a beneficial

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
users? If so explain.	out by the Department.	out by the Commission.	use systems may sell excess water with the approval of the state engineer.	have a distinct status.	use. Direct flow rights are measured in terms of a rate of flow. A storage right holder may store a volume of water and in the future put it to a beneficial use.
Does the system convey different responsibilities to different types of water users? If so explain.	Users who have registered withdrawals are required to report daily volume withdrawn, return flow, and purpose of water use. Registrations must be renewed annually.	Users who have registered withdrawals or have been issued certificates are required to report average monthly volume withdrawn, locations of withdrawals and discharges. Agricultural users whose average daily withdrawal is less than one million gallons/day need not report. **Capacity use areas:** All permit holders are required to report average monthly volume withdrawn, locations of withdrawals and discharges. Non permit holders are required to comply with procedures established to protect and manage the water resources in the area; individual domestic water use is exempt from these procedures	The owner of storage must make surplus capacity available to others on a cost recovery basis.	The most stringent responsibilities are on groundwater users in an Active Management Area.	Direct flow rights are to directly put water to a beneficial use. Storage right holders may store water and then put it to a beneficial use later.
Is each type of user limited in their use of water to: • a specific purpose? • a total volume of diversion? • a total volume that can be used? • a specific time for diverting?	All users are limited in terms of purpose and the total volume of water that can be withdrawn for use. Registrations specify the total volume, diversion and return points, rate of diversion, and uses of water. Registration does not make specifically mention how much of the water can be consumed and how much should be	A registration does not have specific terms and conditions other than reporting requirements for the volume of water. A certificate has terms and conditions that can include volume of diversion, purpose, location and any other conditions that the Commission deems necessary to fulfill applicable statutory	Yes, diversions authorized by permit will all contain these forms of limitations.	A Certificate of Water Right will set out: Flow rate Priority date Beneficial use Time and place of use Source of water Place and means of diversion	Yes. Sometimes, but irrigation rights may be limited by the amount of land to be irrigated and the "duty of water." See above.

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
• a rate of diversion? • a specific water source? • a specified diversion location?	returned.	requirements.	Diversion point may be specified as a tract of land (1/4 section or section) or a specific point.		Yes. Yes, even storage rights may be limited by a rate of diversion. Yes. Yes.

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
Process of acquiring rights to take and use water					
What is the process by which water users obtain the right to use water?	Users must obtain a Registration in addition to Aquatic Resource Alteration Permit (ARAP) that allows for water diversion and withdrawal.	Users must submit a registration or obtain a permit (if located in capacity use areas) or certificate (for inter basin transfer).	Application for a permit for beneficial use prior to commencing construction unless for domestic, livestock, fish and wildlife or recreational uses. All diversions of greater than 12.5 AF require a permit.	To appropriate surface water, a user must file an application with the Arizona Department of Water Resources (ADWR). The application must describe the proposed: source and location of the diversion, beneficial use, quantity, and periods of use. If the application is approved the ADWR will issue a permit that gives the permittee up to 5 years to complete any works and to put the water to a beneficial use. When the permittee actually puts the water to a beneficial use the ADWR issues the permittee a Certificate of Water Right.	Water rights are acquired by the act of appropriation and putting water to a beneficial use. Appropriators may then get their rights determined by water judges who have exclusive jurisdiction over surface water rights determinations. There are 7 water divisions. Within the divisions there are 78 water districts. An appropriator applies to a judge in the district of the diversion for a determination that an appropriation has been made in accordance with the law (discussed below). There are opportunities for persons to file statements of opposition. If there is opposition a referee examines the application and all statements of opposition and makes a ruling. If a protest is made to a ruling the judge will hold a hearing. A water right confirmed by the court is called a "decreed water right." The act of appropriation consists of diversion and application of it to a beneficial use. This involves an open, physical demonstration of intent to take the same for such use. There are two exceptions to this. Physical diversion is not required for the CWCB's appropriation for instream flow protection (see three boxes above). Or for recreational channel

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
					diversions. As well, municipalities may acquire water for future use and lease rights until they put the water to a beneficial use.
What factors are considered before an allocation can be issued?	Factors that are considered include: • Quantity of withdrawal from a source with special concern for low flow conditions; • Protection of present and projected water uses; • Effects on water quality during low flows; • Whether the water is for beneficial use; • Ability of water source to respond to emergencies, including drought; • Effect on navigation, power generation, fish and wildlife habitat, aesthetics, and recreation Other factors as deemed necessary by the Commissioner.	For permits, Commission considers whether withdrawal will result in generalized condition of water depletion or water pollution to the extent that it impairs existing or proposed uses and the injury to the public health, safety or welfare will result. Specific factors that are considered for certificate include: • The necessity, reasonableness, and beneficial effects of the transfer and proposed uses; • The present and reasonably foreseeable future detrimental effects on the source river basin including public, industrial, agricultural water supply needs, waste water assimilation, water quality, fish and wildlife habitat, hydro power generation, navigation and recreation. Municipal water needs are to be evaluated within the context of local water supply plans. • The cumulative effects on the source river basin. • The detrimental effects on the receiving basin including effects on water quality, wastewater assimilation, fish and wildlife habitat, navigation, recreation and flooding.	The rights of a prior appropriator will not be unduly affected. Proposed means of diversion adequate Proposed use beneficial Proposed appropriation in the public interest: (a) benefit to the applicant, (b) effect of economic activity, (c) effect on fish, game and recreational opportunities, (d) alternate uses, (e) harm to other persons, (f) ability of applicant to complete the appropriation	"A. The director shall approve applications made in proper form for the appropriation of water for a beneficial use, but when the application or the proposed use conflicts with vested rights, is a menace to public safety, or is against the interests and welfare of the public, the application shall ue rejected. An administrative hearing may be held before the director's decision on the application if the director deems a hearing necessary. B. An application may be approved for less water than applied for if substantial reasons exist but shall not be approved for more water than may be put to a beneficial use. Applications for municipal uses may be approved to the exclusion of all subsequent appropriations if the estimated needs of the municipality so demand after consideration by and upon order of the director."	Whether water was appropriated in accordance with the law so as to give rise to a water right.

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
		• Reasonable alternatives to the transfer, including their costs and environmental impacts. Withdrawals are not allowed if substantial portions of the water are not returned to the river system after use. The State also has the authority to declare capacity use areas where the use of water (surface and ground) requires coordination and limited regulation for the protection of the public interests.			
Are there requirements for public notification in the process of acquiring rights?	Public notification is required when obtaining ARAP	No formal public notification process for registration, although all registrations that are recorded are available on the Department's website. Permit application can require an environmental assessment part of which includes public notification and participation process. Certificate application has public notification requirements.	Yes. An applicant for a permit must provide notice by certified mail: to owners within one mile radius or by notice to the relevant local government; to other water permittees; to adjacent municipal and public water use facilities.	Yes. The ADWR gives public notice of the application. There is opportunity for public protest. However any acceptable protest must allege that the proposed diversion will - impair a prior water right - is contrary to the public interest, or - will pose a threat to public safety. Where protest has been filed, the ADWR in its discretion may hold a public hearing. After the protest period and hearing (if any) the ADWR may grant or reject the application. Rejection must be on the grounds bulleted directly above.	Yes. See discussion two boxes above.
Is there an opportunity to appeal the issuance of a water right and who can initiate an appeal?	Permittees and applicants for permits who disagree with the Commissioner's decision can appeal to the Water Quality Control Board.	Decision of the Commission regarding water transfer certificate can be appealed by an affected party for a judicial review	The state engineer makes a "recommended decision" on any application. The applicant and any person aggrieved may request a hearing in relation to a recommended decision before	A party to the decision by a director may seek judicial review. "Party" presumably means the applicant and any one who filed an opposition.	Yes. See discussion three boxes above.

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
			it becomes a final decision. There is a right of appeal to the District Court if the state engineer rules that the application does not meet the prescribed criteria		
What is process by which a water entitlement can be amended?	A permit can be modified, suspended or revoked for cause by the Commissioner. Causes include: • Violation of any terms and conditions • Obtaining a permit by misrepresentation • Causing pollution • Violation of environmental statutes • Change in legislation(s) that substantively impacts the contents of the permit • A significant change of the physical condition(s) of the site or the waters Permits for activities that have been completed are not subject to modification.	Water entitlements can be amended by the Environmental Management Commission for those withdrawals for which statutory approval is required.	A permit may be amended to change the point of diversion or use on application and with the approval of the state engineer and evaluated in the same manner as an initial application. No change in point of location will be permitted to the prejudice of other permittees who depend upon the return flows of the applicant. Some changes may be made administratively without the need for re-advertising etc. e.g. change of pumping rates	A change of use of water appropriated for domestic, municipal or irrigation uses requires the approval of the director. A change of use to generate hydroelectric energy or power of over twenty-five thousand horsepower, requires an act of the legislature.	An appropriator seeking a change of use must apply to a water court. Any change of use is subject to the "no harm" rule, including to junior appropriators since they are entitled to "the continuation of stream conditions as they existed at the time of their respective appropriations."

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
Other Questions					
Do water users have to pay an administrative fee to acquire water rights?	A fee must be enclosed as part of the permit application	A fee must be enclosed as part of the registration or certification. Agricultural users registering for the first time are exempt from this fee. Previously registered users who are updating their registrations are also exempt. There is late registration fee, applied daily; however, agricultural withdrawals are not subject to late fees.	Yes; the fee varies with the type s of application (e.g. municipal, irrigation, industrial etc)	For less than 50-acre feet, an application fee to appropriate is $50. For over 50 acre-feet the application fee is $75. A permit fee for less than 50-acre feet is $50 and for over 50 acre feet is $75. The fee to sever and transfer water or transport it out of state is $500.	There are minor filing and administrative fees.
Do water users have to pay an annual or other type of fee to use water? Is this related to the volume of water actually used?	Fee is based on the area of land or the length of water course affected.	Fee is administratively set and is payable at the time of registration or with application for a certificate. Registrations are renewed every five years.	No. Not applicable although there are higher application fees for larger volume users.	There does not appear to be anything in the legislation or rules on this.	In 2003 Bill 03-278 became law which required certain water rights holders to pay the State Engineer an annual fee, as follows: direct flow (1.0+ cfs): $10 agricultural irrigation, recharge, stock watering, $250 all other beneficial uses; storage (100+ acre-feet). $25 agricultural irrigation, echarge, stock watering, $250 all other beneficial uses. This law had a 2-year sunset clause. However given its unpopularity it was repealed in 2004 by General Assembly through House Bill 04-1402. Fees paid were refunded without interest.
Do water users have to report their annual water use?	Water users are required to file their annual water use as part of the annual renewal of registration. In addition, water users are required to maintain copies of registrations of withdrawal for the past three years and all records and documents used	Water users are required to report quantities of water used and withdrawn, sources of water, and the nature of use monthly. Agricultural users whose withdrawals do not exceed 1 million gallons per day do not	The state engineer *may* require permittees to file water use information annually. In practice this is always required.	It appears that surface water use is monitored by water deliveries. There are statutory requirements to report groundwater use within AMA's on an annual basis.	There is no statutory requirement for surface water measurement. However, internet research indicates that water reporting models are being developed. The State Engineer's Office may order that gauges or other measuring devices be

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
	to calculate the amount of water withdrawn on their premises.	need to report.			installed.
What methods do regulators use to monitor water use?	Water use can be monitored using annual filling.	If water use data is not being reported, the Commission has the authority to require water user to install water metering device or other methods acceptable to the Commission to determine the quantity of water being withdrawn.	The state engineer may require permittees to install measurement devices. In practice this is always required.	As noted elsewhere surface water use appears to be monitored by calls on water. For example, about half of Arizona's Colorado River allocation is delivered to central Arizona through The 1968 Central Arizona Project. This water services 56 municipal and industrial users, 10 Aboriginal communities and 10 agricultural districts. Some community water systems must measure withdrawals and report annually. As noted elsewhere, some groundwater users must annually report use.	The State Engineer's Office monitors water deliveries and obtains data this way. .
What tools do regulators have to enforce the legislation related to water use?	Permits can be suspended or cancelled if there is a breach of terms and conditions of the permit.	In capacity use areas criminal and/or civil penalties can be applied to any users, depending on the nature of the violations. If water resource development is not subject to state or federal regulations, water use disputes between riparian users could be handled as a civil law matter in the courts.	Tools include inspections; forfeiture for failing to put water to beneficial use; administrative orders; and applications to court to enforce orders and enjoin unlawful appropriations.	Ceasing to use a water right for 5 years could result in forfeiture. There are a number of enforcement provisions relating to groundwater in an Active Management Area. There are enforcement provisions relating to water exchange conditions (e.g. treated effluent right for potable right).	State administrative officials may initiate enforcement orders and curtailments. This may be to extinguish a water right for intentional abandonment of right, or involuntary loss and forfeiture of a right. Rights may be partially abandoned or forfeited. Junior appropriators, as holders of a property right (which water rights are in Colorado) have a common law right to initiate abandonment or forfeiture proceedings where they might better their priority. The State Engineer's Office has general authority over

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
					investigations, water monitoring, measurements, and records.

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
Does the legislation allow water to be transferred from one major basin to another?	Yes, the *Inter-Basin Water Transfer Act* provides for a mechanism where such transfers can occur.	Yes, there is legislative mechanism for such a transfer to occur. The statute first came into effect in 1994.	The legislation does not preclude transfers and the Code contains several provisions encouraging transfers from the Missouri to provide dependable and adequate sources of good quality drinking water to areas and localities in eastern North Dakota. As a practical matter, most of ND's water is in the Missouri Basin and transfers are necessary to provide residents with good quality water.	There appears to be no limitation on inter-basin surface water appropriations save that (a) a transfer must not cause harm to or diminish water available to other appropriators, (b) a transfer from an irrigation district, agricultural improvement district or water users' association (whether intra-basin or inter-basin) requires the consent of the water users in the district or association, and (c) transfers to an Indian Tribe and other specified Indian groups are limited to 3,600 acre-feet and are subject to court approval. Groundwater cannot be transferred between basins, subject to certain statutory exceptions. Some groundwater right types subject to the *Groundwater Management Act* cannot be severed and transferred.	Yes, within the state. It is unlawful to transfer water out of the state without required approvals.
How is major basin defined? • Hierarchy? • Size? • Between drainage areas? • Cross-border	Major basins are defined in the legislation.	Major basins are defined in the legislation.	ND is divided NW\SE between the Missouri River Basin in the west and the Hudson Bay drainage Basin in the east. Within the Missouri there is the Missouri proper and James River Basin. Within the HB drainage there is the Souris and Red Rivers and the non-contributing Devil's Lake	There does not appear to be a legislated articulation of surface water basins. However in non-legislative material the government states that there are 13 surface water basins in Arizona, and 10 "watershed" areas. As well, there are 26 groundwater basins. According to the Arizona	Some general sources describe Colorado as having 4 major river basins: Colorado, Missouri, Arkansas and Rio Grande. The legislation defines 8 water basins and 1 demographically unique subregion for the purposes of creating 9 permanent basin roundtables

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
considerations?			drainage. There are thus 5 major hydrologic subdivisions. Fifty watersheds have been identified for the purposes of Unified Watershed Assessment for federal Clean Water Act purposes	Department of Environmental Quality (ADEQ) surface water basins are based on hydrologic relationships defined by U.S. Geological Survey (USGS) "hydrologic unit code" (HUC) numbering system. These surface water basins are designated to organize surface waters in relation to Arizona's surface water standards. Watersheds are delineated synchronize ADEQ activities. These include water quality concerns. Most watershed and surface water basins are similar but three watershed basins are the combination of two surface water basins and one surface water basin was split into two watershed basins. This was done to facilitate watershed management group meetings and shared water quality concerns, shared land uses, and geographical proximity.	to facilitate interbasin discussions. These basins are defined in terms of one or more water division areas and/or water management districts. Water division areas consist of lands within defined drainage basin areas of specific rivers and their tributaries as defined by the *Water Right Determination and Administration Act* of 1969. There are 7 Water Divisions and 78 water districts. Hierarchy? None apparent. Size? Comparative outflows from the various major basins vary considerably with the larger geographical areas having smaller outflows (i.e. Arkansas @ < 200,000 af/yr) and some smaller basins having tremendous outflows (i.e. Colorado @ > 4 million ac-ft./yr) All major basins have cross state outflows. Colorado is party to 9 interstate compacts, 2 U.S. Supreme Court decrees and 1 international treaty. Inter-state transfers are prohibited unless approved by state engineer, ground water commission, or water judge.
For what purposes are inter-basin transfers allowed?	Inter-basin transfers are allowed for public water supply systems and also for any purpose for which the State has granted authorization for.	Inter-basin transfers are allowed for any purpose, subject to regulatory approval. The amount of transfer is determined as the amount of water moved from the source basin to the receiving basin.	Inter basin transfers are allowed for any beneficial purpose including municipal and domestic water supply and generally for the public purpose of promoting the prosperity and general welfare of the peoples of North Dakota	Apparently an inter basin surface water transfer may be allowed for any beneficial use.	A collaborative interbasin compact process has been established to facilitate negotiated statewide water management and supply solutions. There appears to be no limit on

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
		less the amount of water returned to the source basin. Only the water consumed or lost in the receiving basin would be considered a transfer. The following are not considered transfers: Discharge of water upstream or downstream from the point where it was withdrawn. Discharge point is situated upstream of withdrawal point such that the water discharges will naturally flow past the withdrawal point Discharge point is situated downstream of the withdrawal point such that the water flowing past the withdrawal point will naturally flow past the discharge point.	(Garrison Diversion)		purposes so long as existing legal rights are not impaired, except that no person or entity may hold water for instream flow uses in Colorado except the CWCB. See discussion 12 boxes above.
Are there limits on the volume of water or distance that water can be transferred?	These are likely included in the terms and conditions of the permits.	Transfer of 100,000 gallons/day needs to be registered with Division of Water Resources. Approval is not needed for this volume of transfer. Registration is also not required for activities directly related or incidental to agriculture, livestock and ornamental and flowering plants where transfers are less than 1 million gallons/day. Transfer of 2 million gallons or more per day, regardless of purpose, requires approval (certificate for transfer) from Environmental Management Commission. Specific limits on volumes and distances are likely included in the terms and conditions of the	No limits prescribed by law.	For in state surface water transfers, just the "no injury" rule. Proposed out of state transfers from the Colorado River have been disallowed on the basis that they will lessen Arizona's entitlement under the Colorado River Compact (2.8 million acre-feet) and that any such diminishment must be agreed to by the states involved an not just by private parties.	There appears to be no limits on the scope of agreements for interbasin transfers, so long as existing rights are not impaired. There are special requirements for out of state transfers. These are: "Prior to approving an application, the state engineer, ground water commission, or water judge, as the case may be, must find that: (a) The proposed use of water outside this state is expressly authorized by interstate compact or credited as a delivery to another state pursuant to section 37-81-103 or that the proposed use of water does not impair the

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
		permits.			ability of this state to comply with its obligations under any judicial decree or interstate compact which apportions water between this state and any other state or states; (b) The proposed use of water is not inconsistent with the reasonable conservation of the water resources of this state; and (c) The proposed use of water will not deprive the citizens of this state of the beneficial use of waters apportioned to Colorado by interstate compact or judicial decree. (4) Any diversion of water from this state which is not in compliance with this section shall not be recognized as a beneficial use for purposes of perfecting a water right to the extent of such unlawful diversion or use."
What is the process by which inter-basin transfers occur?	Individuals wishing to conduct inter-basin transfer must first obtain a permit and satisfy legislative requirements. Two types of permits are issued: individual permit and general permit. The State bears the cost of public involvement portion of the general permit. Unless specifically directed most permits are individual permits.	Inter-basin transfers can occur either through registration of the transfer with Division of Water Resources or issuance of certificate from Environmental Management Commission, subject to volume and water use purposes.	Authorized by permit under the Code provided that for a beneficial use. Any major basin transfer however would likely require federal funds and thus trigger NEPA and the requirement for an EIS. Devils Lake did not trigger a NEPA EIS because no federal money. A basin transfer that is not a beneficial use (e.g. Devils Lake) will not require a water use permit but may require a	The same process as for any permit for a transfer.	A statewide interbasin compact committee (IBCC) has been created to facilitate compact negotiations between basins. The committee includes two representatives from each basin roundtable. Interbasin transfers are negotiated agreements that are voluntary and collaborative. Proponents are not compelled to use the IBCC framework or forum, however any basin/roundtable whose waters are affected by a compact must provide affirmative

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
			discharge permit.		support to the agreement in order for it to be ratified.
Is there a requirement to consult the public or other water users?	The Commissioner must publish the notice of proposed transfer including specific waters affected by the proposed activity as well as the basin of origin and receiving basin. There is a comment period after which Commissioner is required to hold a public hearing on the permit application	The statute requires extensive public notice of the proposed transfer certification to potentially affected parties. There is also a requirement to hold public hearing on the proposed transfer.	Yes; the usual notice requirements would apply as above and also opportunities to participate and comment as part of a NEPA EIS if triggered.	Yes; notice provision as above for any permit application.	Yes. One of the mandates of the IBCC must develop a public education, participation and outreach working group. The process is to be integrated with other planning and public participation processes related to water conservation and development within the state. The committee includes key stakeholders/users from each roundtable/basin.
What tests are used to determine whether an inter-basin transfer is allowed?	Factors that are considered include: • Quantity of withdrawal from a source with special concern for low flow conditions; • Protection of present and projected water uses from "donating" water source; • Effects on water quality on "donating" water source during low flows; • Whether the water is for beneficial use; • Ability of "donating" source to respond to emergencies, including drought; • Effect on navigation, power generation, fish and wildlife habitat, aesthetics, and recreation • The effect on flow and its impact on existing users of the "donating" source.	The overarching test is whether the benefits of outweigh the detriments of the proposed transfer and whether the detriments have been or will be mitigated to a reasonable degree. Specific factors that are considered include: • The necessity, reasonableness, and beneficial effects of the transfer and proposed uses; • The present and reasonably foreseeable future detrimental effects on the source river basin including public, industrial, agricultural water supply needs, waste water assimilation, water quality, fish and wildlife habitat, hydro power generation, navigation and recreation. Municipal water needs are to be evaluated within the context of local water supply plans. • The cumulative effects on the source river basin. • The detrimental effects on	Is the proposed use a beneficial use; and public interest of North Dakota as above.	The same rules as for any permits.	Any basin/roundtable whose waters are affected by a compact must provide affirmative support to the agreement in order for it to be ratified. Ratification requires a broad general level of support by the IBCC. Agreement shall not supersede, abrogate or impair existing water rights.

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
		the receiving basin including effects on water quality, wastewater assimilation, fish and wildlife habitat, navigation, recreation and flooding. • Reasonable alternatives to the transfer, including their costs and environmental impacts. • Consistent with any other applicable statutory requirements.			
What conditions are put on approved transfers?	Conditions can include: • Amount of water to be transferred with seasonal variation, as required • Prohibition on transfer if the instantaneous stream flow of the "donating" river is below a threshold value • Provisions to promote adequate water supply or to mitigate future adverse conditions • Installation, maintenance and use of stream flow equipment • Establishment and reporting of transfer activities. Applicants may apply for permit modification to increase the authorized transfer amount within the term of the permit. Under emergency conditions, the Commissioner may waive usual permit requirements for up to six months or modify or revoke and reissue any inter-basin transfer permits. Permits are issued for a renewable term of not more than five years.	The Commission may grant the certificate in whole or in part with any conditions attached for the fulfilling of the statutory requirements. Conditions can include: • Mitigation measures to minimize detrimental effects • Measures to protect the availability of water in the source river basin during a drought through drought management plan or other emergency conditions • Maximum amount of water that may be transferred. Applicants may apply for permit modification to increase the authorized transfer amount within the term of the permit. Under emergency conditions, the Commissioner may waive usual permit requirements for up to six months or modify or revoke and reissue any inter-basin transfer permits. Permits are issued for a renewable term of not more than five years.	Conditions might include filter and other treatment conditions as well as volume restrictions. Filter requirements more likely to be included as part of a discharge permit rather than as part of the water use permit.	The same sorts of conditions that would be included in any permit e.g. volume and seasonal limitations.	Compact conditions are as agreed between the parties/basin roundtables.
Have any such approvals been	Seven approvals totaling 9.44 millions of gallons/day have	Four certificates totaling 97.5 million gallons/day have been	Yes. A significant number because of the reality that the	Do not have up to date numbers but between 1987	There are 43 trans-mountain

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
issued? How many?	been issued.	issued. Further three applications are being processed.	Missouri is the main source of high quality water for ND.	and 2004 there were about 300.	diversions between basins. There have been 9 interstate, 2 U.S. Supreme Court degrees and 1 international treaty.
For what purpose(s) have transfers been allowed	Municipal water supply	Municipal water supply	Any beneficial use e.g. Domestic water supply (e.g. Northwest Area Supply Project (NAWS) – Missouri – Hudson Bay	A range of beneficial uses (includes groundwater and surface water transfers)	
How do inter-basin transfers affect priority of use between the two basins	The needs and requirements of the "donor" basin must be satisfied before transfer can take place	The needs and requirements of the "donor" basin must be satisfied before transfer can take place	No effect on priority. Priority is determined on the usual basis in the basin of origin	The priority of a right will be fully adjudicated in the point of diversion basin.	Inter-basin compacts do not supersede and may not abrogate or impair existing water rights, which are recognized as private usufructory property rights.

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
Intra-Basin Transfers (Within Major Basins)					
Does the legislation allow water to be transferred from one part of a major basin (sub-basin) to another?	No specific exclusions, however, the general principles of riparian rights generally preclude transfer of water to an area which is not up or downstream riparian of the transferred water.	Yes, under same criteria and conditions as inter-basin transfers. Generally speaking, statutory requirements for inter and intra basin transfers are similar. There is no distinction made between inter and intra basin transfers.	As above. No specific restrictions.	Surface water, yes.	Yes. Water may be transferred by way of a change in the type, place, or point of diversion of water rights by adjudication in the water courts. A temporary/interruptible water supply agreement may in some circumstances be available without at permanent change in water rights with approval of the State Engineer. Agricultural irrigation water rights may be loaned to another agricultural user within the same stream system or to the Conservation Board for instream flows. Water conservancy districts and water conservation districts which hold water rights may enter into cooperative agreements with other state political subdivisions for the lease or exchange of water within or outside of district Water transfers may be achieved within the Arkansas River basin by way of a water bank pilot project. State law now allows water banks throughout the state, though only the Arkansas River basin pilot project has been active. There appears to be no prohibition on transfers between or within basin

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
					systems.
How is each sub-basin defined? • Hierarchy? • Size? • Between drainage areas? • Cross-border considerations?		See inter-basin transfer	See above	I have been unable to locate specific information on this.	See above description of basins under inter-basin transfers.
For what purposes are intra-basin transfers allowed?		See inter-basin transfer	Any beneficial use as above.	Any beneficial purpose	There appears to be no limitations on the purposes for which sale, leases, loans or exchanges of water may be made, with the exception that water cannot be used for instream flows uses except by the CWCB. The Arkansas River water bank pilot project has been initiated to simplify water exchange transactions and to help farmers realize on the value of water rights without permanent severance of land and water rights.
Are there limits on the volume of water or distance that water can be transferred?		See inter-basin transfer	No limits prescribed by law.	(a). Generally, only the limits imposed by the doctrine of beneficial use and any generally applicable limits. (b) for transfers to Indian tribes or related entities limited to 3, 600 acre-feet.	The only limitations appear to be with regard to Article 83 loans of irrigation water: "Loaned water for agricultural irrigation purposes is limited to a term of no more than 180 days in a given calendar year. Loaned water to the CWCB is not to exceed 120 days subject to approval by the state engineer. Such loan not to be exercised for more than 3 yrs in a ten year period under a single approval

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
					None of the water rights involved in a loan can be adjudicated to or diverted at a well more than 100' from the bank of the nearest flowing stream." There appears to be no limits on the scope of transfers/exchanges which may be agreed upon between water conservation/conservancy districts and other political subdivisions. There does not appear to be any limitations on the scope of lawful private exchanges. The Arkansas water bank pilot project does appear to set limits but may impose conditions on exchanges to balance in-basin/out-basin supply and demands and to give priority to Arkansas river uses.
What is the process by which intra-basin transfers occur?		See inter-basin transfer	The process for issuing a permit. In addition, a transfer may trigger NEPA and a discharge into another waterbody may require a permit under the ND Pollution Discharge Elimination system as was the case for Devil's Lake	The same process as for any permit application.	Transfers might occur by changes in water rights as determined by the water courts, by approval of the state engineer, my mutual agreement, or by way of the Arkansas water bank pilot project, or by way of other water banks. Loans must be approved by the state engineer who must determine that the loan will not impair existing rights. Note: the state engineer is given broad rule/regulation making power. The state engineer is expressly invested

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
					with a general supervisory control over the public waters of the state. Exchanges of water between water conservation/ conservancy districts and other political subdivisions proceeds by mutual agreement without apparent limitation.
Is there a requirement to consult the public or other water users?		See inter-basin transfer	Same as for issuing a permit as above. NDPDES requirements will trigger a public hearing.	Yes; as above.	Notice of proposed loans is given to water rights holders who may be affected (see process outline above) Establishment of a water bank within a water division requires public consultation.
What tests are used to determine whether an intra-basin transfer is allowed?		See inter-basin transfer	Is the proposed use a beneficial use; Public interest	The same rules as for any permit application.	The state water engineer must determine that an exchange or loan will not injure existing water rights.
What conditions are put on approved intra-basin transfers?		See inter-basin transfer	Conditions might include: (1) filter, screening and other treatment conditions, (2) volume restrictions, (3) seasonal restrictions, (4) restrictions on sulphate concentrations or other pollutants, (5) ongoing monitoring and assessment requirements. All required in the case of Devil's Lake but required in the discharge permit because no water use permit required because no beneficial use. Devil's Lake Water Outlet Advisory Committee	The same types of conditions as included in any permit	Loan conditions are at the discretion of the state engineer.
Have any such approvals been issued? How		See inter-basin transfer	Yes. Many as above.	Many.	Intra-basin diversions and transfers occur fairly frequently

STATE:	Tennessee	North Carolina	North Dakota	Arizona	Colorado
many?					
For what purpose(s) have intra-basin transfers been allowed		See inter-basin transfer	Any beneficial use; Domestic and municipal water supply and flood control.	A range of beneficial purposes	Variety of purposes, including one agricultural use to another (e.g. transfers to augment irrigation wells), from agricultural use to municipal use, and others
How do intra-basin transfers affect priority of use between the two sub-basins		See inter-basin transfer	No effect on priority. Priority is determined on the usual basis in the basin of origin.	The priority of a right will be fully adjudicated in the point of diversion basin.	No effect on priority

STATE:	California	Montana	Wyoming	Utah
		Legislative Overview		
Type of water rights system: Riparian Prior allocation Prior appropriation Hybrid	Hybrid. California is considered to have the earliest and most fully developed hybrid system. Hybrid systems may also be referred to as the "California Doctrine" See details below.	Prior appropriation pre-1973; prior allocation (permit) based on prior appropriation post-1973 Water rights originating on or before July 1, 1973 based on prior appropriation to be finalized by an adjudication system in Montana Water Court. A permit (or prior allocation) scheme in place for new water rights for new (post 1973) and changes in use of existing water rights .	Prior Appropriation – "first in time, first in right". Those holding an early priority are allowed to receive the full portion of their water right before those with junior priority. Priority date is established by the date of acceptance by the State Engineer.	Prior Appropriation – first in time, first in right
List all pertinent legislation and regulations?	California Constitution, Article 10, Water & Article 10A, Water Resource Development Title 23: California Water Code California Public Resources Code [includes Chapter 5093, California Wild & Scenic Rivers Act] Other Codes with provisions that relate to water include: Fish & Game Code, Health & Safety Code, Food & Agriculture Code, Harbors & Navigation Code, Public Resources Code	Montana Constitution, Article IX Montana Water Use Act, Title 85, c.2 Montana Code Annotated Department of Natural Resources and Conservation, Water Rights Bureau, Administrative Rules of Montana, Title 36, c.12 Environmental Policy Act, Title 75, Montana Code Annotated Yellowstone River Compact 1950 (MT, ND and Wyoming) There are in addition 13 water compacts with federal entities and Indian tribes confirming reserved water rights entitlements; (5) with tribes, (1) with the National Park Service, (1) with BLM, (3) with US FWS, and (3) Department of Agriculture. Mont. Code Ann. Title 85, C. 20. Compacts require decree from Montana Water Court and Tribal Compacts require ratification by Congress. Boundary Waters Treaty, Article VI re the Milk and St. Mary Diversion Montana Administrative Procedure	Wyoming Constitution Title 41 – Wyoming Statutes	Utah Code – Title 73

STATE:	California	Montana	Wyoming	Utah
		Act, Mont. Code Ann. Title 2, Ch. 4		

STATE:	California	Montana	Wyoming	Utah
In stream Requirements/Water Availability for Consumptive Uses				
How does the system determine how much water can be made available for consumption?	The State Water Board will make a determination upon review of an application for a water right permit. The California Constitution mandates that water in the State is to "be put to beneficial use to the fullest extent of which they are capable" without waste or unreasonable use and with a view to public welfare. All water use in the State is to be metered. An application for a new water appropriation is approved if it is determined to be for a useful or beneficial purpose and if water is available for appropriation. In evaluating an application, the Board considers the relative benefits derived from the beneficial uses, possible water pollution, and water quality. Water in a natural channel is available for appropriation if: it has yet to be appropriated; it is no longer being put to beneficial use, or it has after being appropriated flowed back into the stream. The Board may declare a stream system fully allocated and accept no further applications for permits.	All basins are open for further applications for consumptive water use unless closed. An applicant for a permit (see below) must show that there is sufficient water physically and legally available for the proposed use and no adverse effect to existing appropriators. Basins may be closed: temporarily; to certain types of new appropriation; to appropriations at certain times of the year; A Basin may be closed: by the Legislature; administratively on the petition of water users or the Department of Environmental Quality; or by way of a compact. Ground water areas may be closed or control measures put in place. Mont. Code Ann. §85-2-506 and -507	The water of all natural streams, springs, and other collections of still water are property of the State. For irrigation use, 1 cfs per 70 acres during regulation.	All water belongs to the State, subject to existing rights of water use. The amount of water that is available for consumption is determined through investigation by the State Engineer
Are there limitations related to instream or environmental requirements and what is the mechanism for this?	The use of water for recreation and preservation and enhancement of fish and wildlife resources is a beneficial use of water. The board (subject to Sec. 100 policies) may when it is in the public interest approve appropriation by storage for release for instream uses.	The department may issue a state water reservation for instream flows and related purposes to the state, any political subdivision of the state, or any agency of the state or of the United States. DNRC reviews all permit applications to determine if pose significant	The Wyoming Water Development Commission (WWDC) must file an application on behalf of the state for permits to appropriate water for instream flows, as recommended by the Game and Fish Commission	The State Engineer may withhold approval of an application if it believes that water appropriation will unreasonably affect public recreation, the natural stream environment, or will be detrimental to the public welfare.

STATE:	California	Montana	Wyoming	Utah
		environmental impacts and to determine if EIS required. Water held under an existing consumptive right may be changed, transferred to or leased to an entity (private or Montana Department of Fish, Wildlife and Parks) for instream purposes. Requires a Temporary Change Authorization (form 606)		
What factors are considered or what process is used to determine the quantity of water available for consumptive use?	When a new water use permit application is submitted the Board must determine whether or not water is available for appropriation based on review of the public interest an amounts of water required for recreation and the preservation and enhancement of fish and wildlife resources. The Board must notify the Department of Game & Fish, which has the authority to recommend amounts of water necessary to preserve fish, wildlife, and recreation in the affected stream. The board considers these recommendations and may set instream flow requirements as conditions for the new permit.	Any applicant for a permit must demonstrate that water physically and legally available for proposed use. The amount of water requested for the beneficial use (instream) must be justified by generally accepted scientific method.	Unappropriated water flowing in any stream may be appropriated for instream flows to maintain or improve fisheries. Priority date is established by filing of ISF application.	This is determined through investigation by the State Engineer.
What priority if any is assigned to water for instream or environmental purposes/	New instream flow rights retain the priority date of the original right where transferred.	Generally priority is based on the date of filing an application for a permit – post 1973 Reserved water right compacts may create priorities for federal entities e.g. National Parks, BLM, and US FWS.	Low priority. Water may be appropriated for instream flow if it does not impair or diminish the rights of any other water user.	Unappropriated water rights may not be allocated for instream purposes. However, the purpose of existing water rights may be altered for instream flow, by transferring the right to the Division of Wildlife Resources or the Division of Parks and Recreation. These divisions can purchase water rights specifically for instream purposes, with legislative approval. Currently this is the only type of instream right recognized in Utah.

STATE:	California	Montana	Wyoming	Utah
Rights to Take and Use Water				
How does the system allocate water to individual water users? (List all that apply)	California's hybrid system of water rights may be considered a "plural system." Riparian rights are recognised and protected together with appropriation rights. There is also a separate doctrinal basis for ground water, as well as pueblo rights. Water rights in California are use rights, not ownership rights. All waters are the property of the state.	An existing water right (prior appropriation rights based on putting water to beneficial use prior to 1973) A water use permit (for water rights post 1973) A certificate of water right (confirming project completed as contemplated by permit) A water reservation. A water reservation is granted on application to the DNRC by the State of Montana (or political subdivision/ sub-unit (e.g. conservation districts, or agency) or by the United States of water for future beneficial uses or to maintain minimum flows or quality. Temporary permit (e.g. for oil and gas exploration) Interim permit (discretionary pending granting of application)	Anyone seeking to acquire the right to the beneficial use of public water must apply to the State Engineer for a permit.	In order to acquire a water right a person must make an application to the State Engineer for appropriation of water, even for small amounts of water. Surface water put to use before 1903 and groundwater put to use before 1935 are considered to be water rights based on diligence. Diligence Claims mat still be filed with the State Engineer for these historical water rights if they are not already recognized on the State Engineer's records an if they are still in use.
How are different types of water users defined? What are the triggers?	Riparian rights result from the ownership of land bordering a surface water source (a stream, lake, or pond). Appropriative rights are acquired by putting surface water to beneficial use. Prior to 1914, appropriative rights could be claimed by simply diverting and using the water, posting a notice of appropriation at the point of diversion, and recording a copy of the notice with the County Recorder. Since 1914, the acquisition of appropriative rights has required an application through the State Water Board. Pueblo rights are derived from Spanish law whereby Spanish or	Terms such as domestic use, irrigation use and municipal use are defined in the administrative rules	Permits are issued for different types of water rights 1) Transporting water through ditch or pipeline 2) For storage in reservoirs 3) Storage for smaller reservoirs for livestock or wildlife purposes 4) Enlargement of existing ditch or storage facilities 5) Instream flow purposes 6) All water wells	Utah recognizes different the following different purposes as qualifying as beneficial use. Domestic use – water used for inside household purposes only Irrigation – the controlled application of water to land to supplement that supplied by nature (outside watering); includes watering crops, lawns, gardens, orchards, and landscaping Stockwatering – to supply water to livestock Municipal – water used by a municipality within its limits and/or service area

STATE:	California	Montana	Wyoming	Utah
	Mexican pueblos could claim water rights. These rights grant a right to the municipal use of all naturally occurring water from the watershed which flows by way of stream through the original pueblo, by pueblo residents.			Mining and milling Hydropower generation Instream flow – non-consumptive water requirements or uses that do not require diversion from its natural watercourse nor reduce the water supply, including the propagation of fish, public recreation, and the preservation or enhancement of the natural stream environment Other – industrial, recreation, aquatic culture, commercial, cooling, geothermal, manufacturing and other users
What rights does each type of water users have to take and use water?	Riparian Rights: • riparian rights are of equal priority as among riparians • unless adjudicated, the right is not quantified, rather it extends to the amount of water which can be reasonably and beneficially used on the riparian parcel (present & future) • riparian rights are correlative; during times of water shortage, the riparian proprietors share the shortage • water may be used only upon that portion of the riparian parcel which is within the watershed of the water source • the riparian right does not extend to seasonal storage of water • the riparian right is part of the riparian land and cannot be transferred for use on other lands • the riparian rights remains with the land when riparian lands are sold • when riparian lands are subdivided, parcels which are severed from the adjacent water source lose their riparian rights, unless the rights are reserved • a riparian right is not lost by non-use	The amount of water is defined by the permit, reservation, or exception to the permit. The amount approved is the amount justified by the water right applicant and physically and legally available and the amount justified for the specific use. Diversions are for specific purposes. The Department has general permitting standards for specific uses (e.g. for irrigation) prescribed in the regulations. Irrigation standards (AF) for example vary with climatic area and method of irrigation.	Permit holders are restricted by the terms and conditions set by the State Engineer when the permit is issued.	All appropriators have the right to use water for the specific purpose for which the appropriation was approved, from the specific source and in the volume specified in the application. Water rights are considered 'real property'

STATE:	California	Montana	Wyoming	Utah
	Appropriative Rights: • first-in-time, first-in-right • limited to the amount of water put to actual ongoing beneficial use • recognised beneficial uses include: aquaculture, domestic, fire fish & wildlife uses, frost protection, heat control, industrial, irrigation, mining, municipal, power generation, recreation, stockwatering, water quality control • appropriative rights are severable from the lan; may be leased, exchanged or transferred with approval • rights may be forfeited for non-use (after 5 years) or abandoned (voluntary without intent to re-use) Pueblo Rights: • limited to ordinary municipal type use by residents within the pueblo • may be paramount to other water rights within the watershed • not limited in quantity; may increase with population growth/expansion of pueblo limits • non-transferable			
How is priority among water users addressed?	Riparian rights are senior to most appropriative rights, and riparian landowners may use natural flows directly for beneficial purposes on riparian lands without applying for a permit. Pueblo rights are paramount to the beneficial use of all needed, naturally occurring surface and subsurface water from the entire watershed of the stream flowing through the original pueblo. Water use under a pueblo right must occur within the modern city limits, and excess water may not be sold outside the city. The quantity of water available for use under a pueblo right increases with population and with extensions of city limits. In general pueblo rights are limited to	Priority is based on time. For pre-1973 rights priority based on date water use began or notice posted or filed in accordance with the law at the time of the appropriation. For post-1973 permit rights priority based on date original permit application received.	Preferred water uses – preference rights in following order 1) Drinking water – humans and livestock 2) Water for municipal purposes 3) water for steam engines, railway use, cooking, laundry, bathing, refrigeration, steam and hot water plants and power plants 4) industrial purposes Use of water for irrigation is superior to water used for turbine purposes used for power purposes	Appropriators have priority based on the date of application. Each appropriator is entitled to their entire amount before any subsequent appropriator has any right.

STATE:	California	Montana	Wyoming	Utah
	use of water for ordinary municipal purposes.			
Does the system convey different rights to different types of water users? If so explain.	Yes. See above. Note: California has codified the policy that "the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation." California has also codified the policy that "the right of a municipality to acquire and hold rights to the use of water should be protected to the fullest extent necessaryfor existing and future uses" where uses are reasonable and non-wasteful California also codified the policy "to support and encourage the development of environmentally compatible small hydroelectric projects as a renewable energy source."	Water permits and rights are held for particular uses. Federal reserved water rights have a distinct status.	Water is a property right, which is attached to the land for purposes of irrigation or for other purposes for beneficial use. Water rights for the direct use of the natural unstored flow of any stream are affixed to the land or purpose for which they were acquired and can only be changed by the Board of Control (BOC).	In times of scarcity, domestic and agricultural purposes have priority among water rights with equal priority.
Does the system convey different responsibilities to different types of water users? If so explain.		A water right holder who has the right to use, sell or dispose of water has the duty to sell any surplus at the usual and customary rates: Yates comments that this is an old statutory provision that isn't actively used. The general duty of a water right holder in a priority system is not to adversely affect senior appropriators.	If a permit for water use is not used for a beneficial purpose within five years, it is considered to be abandoned.	All water users have a continuing obligation to place all of the water right to a beneficial use.
Is each type of user limited in their use of water to: • a specific purpose? • a total volume of diversion? • a total volume that can be	Different types of rights have different limitations. See above. Appropriative rights are limited to their specified purpose unless amended. See below.	A final decree in a water rights adjudication for a pre-1973 right will specify: Flow rate Priority date Beneficial use Period of diversion/period of use and place of use	The individual permit for water use specifies the purpose and place of diversion of the water. These can only be altered by filing a petition and paying the specified fees to the Board of Control. The change in use, place of use or point of diversion may be allowed by the BOC as long as it does not exceed the amount of water historically diverted.	Each water right is defined by its nature of use, period of use, water sources, diversion location, quantity (flow rate and/or volume), and place of use. Some water rights have the rights to store water. Some rights are also quantified be depletion (consumptive use). The Utah gov't provides a guideline for approximate use.

STATE:	California	Montana	Wyoming	Utan
used? • a specific time for diverting? • a rate of diversion? • a specific water source? • a specified diversion location?		Source of water Place and means of diversion By case law, beneficial use is the measure and the limit of a water right.		Domestic use – Full time use (permanent residence) is generally permitted 0.45 acre-feet per family; part time (seasonal or recreational) is generally permitted 0.25 acre-feet per family Irrigation – Generally valid between April 1 and October 31. Diversion amount varies between 2 and 6 acre-feet per acre, depending on the area (Utah gov't map indicating the regions) Stockwatering – Use permitted year-round, unless otherwise stated. Values for diversion vary depending on animal (for example, 0.028 acre-feet per cow, 0.0056 acre-feet per sheep). Other uses are quantified by the amount of water needed for that particular use.

STATE:	California	Montana	Wyoming	Utah
Process of Acquiring Rights to Take and Use Water				
What is the process by which water users obtain the right to use water?	Riparian Rights: • result from ownership of riparian lands; no permit or license is required • unless adjudicated, the right extends to actual and reasonable future quantities that may be put to beneficial use Appropriative Rights: • prior to 1914 rights were acquired by actual appropriation (diversion & use) and posting with the County Recorder • post 1914, appropriative rights are acquired by application to the State Water Board for a water use/right permit • current process: ○ an application for a water use permit is filed with the State Water Board; ○ the Board must make any investigations necessary to review the application ○ a permit may be approved in full or it may be subject to specified conditions; ○ once the Board issues a permit, the use and diversion of water is authorized; ○ once the permittee completes the necessary works, the water is put to full beneficial use, and all terms and conditions are met, a license is issued. The license is the final confirmation of an appropriative right and it remains in effect as long as the license conditions are met and the water is put to beneficial use. Pueblo Rights: • are recognised historical rights to use water for specifically municipal purposes	For new water rights (post 1973) Apply to DNRC for (an Application for Beneficial Water Use Permit, form 600) and receive a Permit to Appropriate Water Exceptions for: small (15 AF) livestock pits or reservoirs located on non-perennial flowing streams; groundwater source less than 35 gallons\minute & 10AF per year	To obtain a permit for use of water, you must submit an application to the State Engineer. This must include the application form, all necessary maps and plans and the appropriate fee. The application must state the source of water supply and the nature of the proposed use. The State Engineer evaluates the application, if approved will issue a permit for developing a proposed water project. This project must be commenced within a specified time limit (usually 1 year) and the must be completed within 5 years. Must submit a notice of completion and a notice of beneficial use. Then a final proof of appropriation is submitted. If this is accepted by the Board of Control, then a Certificate of Appropriation is issued, which is then listed as an adjudicated water right that is permanently attached to the specific land or place of use. Simplified application procedure for certain projects, which do not require maps or plans 1) Construction of small reservoirs for stock purposes, fishing reserve water or wetland ponds 2) Construction of small flood-detention dams 3) Development of springs for stock water or domestic purposes (if less than 25 gpm) 4) Domestic uses for water directly	Water rights acquired through application to the State Engineer (Division of Water Rights). The application must include the name and address of the applicant, the nature of the proposed use, the quantity of water to be used, the time of year it will be used, the name of the stream or source water will be diverted, the dimensions of the diversion channel, and other facts to define the purpose of the proposed appropriation. For proposed irrigation use, the application must include the total acreage of the land to be irrigated, and the character of the soil For proposed water power use, the application must include the number, size and kind of wheels to be used, the amount of power to be produced, the purposes and places the power is to be used, and the point where the water is to be returned to the stream or source. For milling or mining, the application must include the name and location of the mine or mill, its nature, and the place where the water is to be returned to the stream or source.

STATE:	California	Montana	Wyoming	Utah
			from a stream (less than 25 gpm)	
What factors are considered before an allocation can be issued?	Riparian Rights: do not require a permit Appropriative Rights: An application for a new water appropriation shall be allowed if it is determined to be for a beneficial purpose and if water is available for appropriation. In evaluating an application, the Board considers the relative benefits derived from the beneficial uses, possible water pollution, and water quality. If a permit is approved, it may be approved in full or it may be subject to specified conditions. "The board shall allow the appropriation for beneficial purposes of unappropriated water under such terms and conditions as in its judgment will best develop, conserve, and utilize in the public interest the water sought to be appropriated." A decision or order from the Board is reviewable by the Superior Court.	Must satisfy the criteria specified Mont. Code Ann. 85-2-311 in form 600 and show by a preponderance of evidence that: Water physically available at point of diversion in the amount applicant seeks Water legally available (i.e. taking account of prior appropriations) No adverse effect on Water rights of a prior appropriator and state water reservation Proposed diversion works adequate Proposed use is a beneficial use Applicant has property interest where water will be put to beneficial use Additional criteria for volumes greater than 4,000 AF and 5.5. cfs And more stringent standards apply of the water is to be used outside the state	State Engineer must evaluate the application to ensure that there is available, un-appropriated water and the proposed use does not interfere with existing rights or harm public welfare.	If there is unappropriated water in the source, if the proposed use will not impair existing rights or interfere with a more beneficial use of the water, if the proposed plan is physically and economically feasible and not detrimental to the public welfare, the applicant has the financial ability to complete the project, and if the application was filed in good faith and not for the purposes of speculation of monopoly, the state engineer has a duty to approve an application. The State Engineer may withhold approval or rejection until the matter has been investigated if it believes that a water appropriation will interfere with the more beneficial use of water for irrigation, domestic use, stock watering, power or mining development, or manufacturing, or will unreasonably affect public recreation, the natural stream environment, or will be detrimental to the public welfare.
Are there requirements for public notification in the process of acquiring rights?	Yes. When an application for a water right permit is filed, public notice is given to interested parties. This indicates an opportunity to file protests against the proposed application. A field investigation or a Board hearing may be conducted.	Yes. Applicant mails notice to all existing water users in DNRC records and may be required to publish notice of application in newspaper. DNRC may hold a hearing (through an examiner) if objection(s) is filed. Examiner issues "proposal for decision"; DNRC issues final order after further exceptions to proposal and potentially oral arguments. There are detailed procedural rules for hearings by examiners.	During the permit application phase – no. Once the final proof of appropriation has been submitted to the Water Division superintendent, this proof is published in a local newspaper.	When an application is received, the State Engineer will publish a notice of application once a week for two consecutive weeks in a local newspaper. Advertising may be waived for small applications subject to the discretion of the State Engineer

STATE:	California	Montana	Wyoming	Utah
Is there an opportunity to appeal the issuance of a water right and who can initiate an appeal?	See above. A decision or order from the Board is reviewable by the Superior Court.	A final order may be appealed to the State District Court. An appeal may be launched by a party who had standing to object to issuance of the permit and who filed an Objection to Application (form 611) and participated in the agency process below and exhausted all administrative remedies.	Can appeal the State Engineer's decision to the Board of Control. The decision of the Board of Control may be appealed to District Court	An person with an interest may file a protest with the State Engineer within 20 days after the notice is published (30 days if the adjudicative proceeding is formal). The State Engineer may hold a hearing prior to issuing a decision on an application. Only the applicant and those who file timely protests (protestants) may appeal the State Engineer's order. A protestant or applicant may submit a Request for Reconsideration (appeal) to the State Engineer after and Order of the State Engineer is issued. The State Engineer may re-issue the Order based on additional information received in the appeal. A protestant or applicant may obtain a judicial review of the order in the county in which the water source is located. Filing a Request for Reconsideration is not a prerequisite to seeking judicial review
What is process by which a water entitlement can be amended?	The holder of an appropriative right may change the point of diversion, place of use, or purpose of use, so long as other rights are not injured by the change. In order to change an attribute of a water right, a change application must be filed with and approved by the Board. Change applications follow an application process similar to that described above for appropriation applications.	Must apply to DNRC (Form 606, Application for Change of Appropriation Water Right) if proposing to change or add: Point of diversion Place of use Purpose of use Place of storage Must show that: No adverse effect on other appropriators Adequate works Beneficial use Necessary property interest	Can apply to the State Engineer to amend the permit or can petition the BOC to change the point of diversion, use or place of use.	Any person with a water right can make permanent or temporary changes to the point of diversion, place of use, and purpose for which water was originally appropriated by application to the State Engineer. The State Engineer must follow the same procedures for amending a water right as used to consider a new application for water appropriation, except for publishing if the change in point of diversion is less than 660 feet. The State engineer may not reject an application for permanent or temporary changes for the sole reason that it may impair the vested rights of others. The applicant may demonstrate how potential impairment

STATE:	California	Montana	Wyoming	Utah
				will be compensated.

STATE:	California	Montana	Wyoming	Utah
Other Questions				
Do water users have to pay an administrative fee to acquire water rights?	Yes. There is an application fee related to the permit process for appropriative rights.	Yes. For example, an application for a beneficial water use permit and an application to change a water right both require fees of US $400 In addition there may also be advertising costs.	Direct flow water right applications a) Stock and/or Domestic purposes ($25) b) All other purposes ($50) Reservoir storage applications a) Stock reservoirs ($25) b) Reservoirs >20 acre feet, but < 100 acre feet in capacity ($50) c) All other reservoirs ($125) Temporary water right applications ($50) Formal petitions to modify or change a permit or application ($20) Processing water exchange permits ($25)	Yes. The fee varies depending on the amount of water diverted. For example < 20 acre feet = $75 20-100 acre feet = $100 100-500 acre feet = $125 > 11,500 acre feet = $500
Do water users have to pay an annual or other type of fee to use water? Is this related to the volume of water actually used?	Water in the State is a public resource. "The right to collect rates or compensation for the use of water supplied to any county, city and county, or town, or the inhabitants thereof, is a franchise, and cannot be exercised except by authority of and in the manner prescribed by law."	Application for beneficial water use permit, $400 and the same for an application for change of appropriation. Fees are for processing of applications not actual water use. Fee schedule at http://dnrc.mt.gov/wrd/water_rts/wr_general_info/wrforms/613.pdf No.	No.	No. However, users who are part of a distribution system regulated by a river commissioner must pay an annual assessment to cover the pro rate costs associated with the commissioner.
Do water users have to report their annual water use?	Yes.	Some permit and change authorizations require water use and measurement reporting. There is no general measurement requirement applicable to all water use. Measuring devices may be required in the context of water commissioners delivering water.	Yes, if required by the permit conditions.	Some users are required to report their uses because of conditions imposed in Orders of the State Engineer granting their applications. Most large water users voluntarily report their water use as part of the State's Water Use Program.

STATE:	California	Montana	Wyoming	Utah
What methods do regulators use to monitor water use?	Metering & reporting. See above.	The state has a special program for water measurement in chronically dewatered basins. Measuring devices may be required in the context of water commissioners delivering water.	All forms of flumes, weirs and meters.	River Commissioners monitor systems by physically turning the gates and controlling the diversions on the river system. There are a growing number of diversions that are electronically measured and reported in real-time on the state's website. All major water diversions are published each year in a River Commissioner's Report.
What tools do regulators have to enforce the legislation related to water use?	The Board may issue cease & desist orders to enforce water rights. If there is failure to comply with a Board order, the Board may request the Attorney General to petition the superior court for a prohibitory or mandatory injunction or restraining order. A fine of up to $1000/day may be imposed for violation of a Board Order. Civil liability may be imposed by the Court or administratively by the Board. All funds recovered are deposited in a Water Rights Fund.	Water rights and enforcement of priority of water rights under the supervision of Montana State District Court. The Department or county attorneys may seek enforcement in the appropriate district court. A person who fails to comply with the Code or an order of the Department is guilty of a misdemeanor The Court may (on petition) appoint a water commissioner to measure, record and distribute water rights. See Water Right Enforcement Options handout	The SE may request the AG to bring a suit for the unlawful appropriation, diversion or use of water – may seek a temporary restraining order, preliminary or permanent injunction The SE or the Board of Control may issue a written notice of violation with either a fine of $1250 or 3 months imprisonment, depending on the violation.	The State Engineer must issue an initial order, either a notice of violation or a cease and desist order, to enforce a violation. The SE may then issue a final order to enforce compliance. These include both administrative penalties and criminal penalties, depending on the violation.

STATE:	California	Montana	Wyoming	Utah
Inter-Basin Transfers				
Does the legislation allow water to be transferred from one major basin to another?	Yes, with some exceptions. California has codified as state policy: "to facilitate the voluntary transfer of water and water rights where consistent with the public welfare of the place of export and the place of import." And declares it to be in the public interest to conserve water by assisting in voluntary transfers to allow more intensive use of developed water resources. The State promotes & facilitates water transfers. The Constitution restricts diversion, storage and transfer from the *California Wild Scenic River System* for export to another major hydrologic basin of the State, unless authorized by specific types of statute. The Constitution stipulates that no public agency may acquire water rights in the Sacramento-San Joaquin Delta by eminent domain or contract for the purpose of exporting the water from the Delta.	After July 1 1973 only the Department may hold a permit for a transfer out of certain basins or for amounts in excess of 4,000 AF per year and 5.5 cfs consumed Prior to that basin transfer rights might have been acquired consistently with prior appropriation principles. In addition the Yellowstone River Compact between Montana, North Dakota and Wyoming provides that no water shall be diverted from the Basin without the unanimous consent of all the signatory states. In addition, special rules apply to out-of-state transportation and use of water. Out of state transportation may also trigger leasing requirements. Future transfers involving federal money or programs would likely trigger NEPA.	Inter-basin transfers are permitted	Utah statutes allow the place of use of an existing water right to be changed. The law does not prohibit new appropriations from transferring water to other basins. Water may also be exported for use in other states. Proposals to export water to other states must meet the requirements outlined in U.C. 73-3a-108.
How is major basin defined? • Hierarchy? • Size? • Between drainage areas? • Cross-border considerations?	California does not appear to define or use the language of 'basins,' rather there are 10 identified hydrologic regions. Hydrologic regions include groundwater systems. There are numerous aqueduct and other structures in place to transfer water between regions. Cross-border: In the case of an interstate stream, an appropriation of water in California for use in another state "may be made only when, under the laws of the latter, water may be lawfully diverted therein for beneficial use in this State."	There are three continental water basins in Montana: the Columbia, Hudson Bay drainage and Missouri drainage. The Hudson Bay drainage is represented by the St. Mary Basin There are two sub-basins for the Columbia: Clark Fork and Kootenai The Missouri included the Yellowstone, Little Missouri and Missouri Basin. The state recognizes four main geographical drainages for administrative purposes; the Lower Missouri, the Upper Missouri, the	By major river basin.	There are three continental drainage systems in Utah: the Columbia River Drainage, the Colorado River Drainage, and the Great Basin Drainage (which has no outlet to the ocean). There is nothing in the statute that separates these basins from each other. So although they are hydrologically separate, statutorily all water is simply considered to be "waters in the state. There are seven regional offices in the state which administer water rights in a portion of the state. These regions are generally defined by major drainage basins such as the Utah Lake/Jordan River Drainage or the

STATE:	California	Montana	Wyoming	Utah
		Yellowstone River and the Clark Fork River. There are considered to be 85 basins in Montana for the basis of water rights adjudication by the Water Court		Sevier River Drainage. These regions are further divided into a total of fifty "water right areas" across the state of Utah. The boundaries are generally defined by major hydrologic features such as rivers and topographic divides. There are also several smaller sub-areas such as canyons or other independent flow systems that may be recognized and managed separately. All basins and sub-basins within the state are defined by the State Engineer and not by the legislature.
For what purposes are inter-basin transfers allowed?	Any purpose consistent with public welfare.	An inter basin transfer may be allowed for any beneficial use so long as it meets the requisite criteria; examples include the St. Mary\Milk basin transfer which is principally for irrigation purposes (commenced in early 1900s).	Any recognized beneficial use.	Any recognized beneficial use.
Are there limits on the volume of water or distance that water can be transferred?		There are no such limits except in relation to major basin transfers outlined above where only the Department may hold a permit for a transfer out of certain basins and for above 4,000 AF per year and 5.5 cfs consumed	No	There are no statutory limits on the volume of water or distance that water can be transferred.
What is the process by which inter-basin transfers occur?	Department of Water Resources? Amendment process as above?	The same process as for any permit for an appropriation; Special rules apply to out-of-state transportation and use of water.	The Water Development Commission shall address the impact of the diversion and recommend measures to mitigate any adverse impact identified in the basin of origin.	An Application to Appropriate or Change Application must be filed with the State Engineer. The statute does not distinguish between inter-basin transfer applications and other applications. The same analysis criteria found in U.C. 73-3-8 apply to both. Export application, which propose to take water out of state, are, however, subject to additional analysis criteria as set forth in U.C. 73-3a-108.
Is there a		Yes; public notice provision as above	Permits cannot be granted if they are	Applications must be advertised in a

STATE:	California	Montana	Wyoming	Utah
requirement to consult the public or other water users?		for any permit or change application.	detrimental to the public welfare.	local paper once a week for two consecutive weeks. Small applications may be exempted from this requirement subject to the discretion of the State Engineer. A hearing may be held at the request of the protesting parties.
What tests are used to determine whether an inter-basin transfer is allowed?	In considering the authorization of a project that will develop water for use outside of the watershed of origin the Legislature will consider at the same time consider the authorization and the development works within the watershed that may be required. Existing rights and the interests of those that rely on the water are to be fully protected.	The same rules as for any permit and change application except where the inter basin transfer would be for out-of-state transportation and use of water in which case special and more demanding criteria apply. Is this correct.	The proposed use is beneficial, does not impair existing rights, or is not detrimental to the public welfare.	All applications are evaluated based on the provisions of U.C. 73-3-8, for in-state transfers. This section of the code is summarized earlier in this document as a response to "What factors are considered before an allocation can be issued?" For transfers out of the state, U.C. 73-3a-108 applies. The additional conditions that this section imposes are that the application is consistent with Utah's reasonable water conservation policies or objectives, is not contrary to the public welfare, does not impair the ability of the state of Utah to comply with its obligation under any interstate compact or judicial decree which apportions water among Utah and other states, and the water can be transported, measured, delivered, and beneficially used in the recipient state.
What conditions are put on approved transfers?	Conditions may be imposed at the Board's discretion. See comments on water appropriation amendments above.	The same sorts of conditions that would be included in any permit or change to prevent adverse effect to senior appropriators e.g. volume, metering and measuring, reporting, and seasonal limitations.	A multitude of conditions including season and volume may be applied	They are all approved subject to the priority dates of other water rights. Other common conditions are that water use measurements must be reported to the state or that compensation must be provided to other water right holders that are impacted.
Have any such approvals been issued? How many?		No known permits post-1973 (Yates)	Yes – number is small.	These types of applications have been approved since the creation of relevant appropriation statutes in 1903 (and maybe even earlier). Inter-basin transfers are a major source of water for the population centers of the state.

STATE:	California	Montana	Wyoming	Utah
				There are several major projects which divert and store water in the Colorado River Basin in the eastern part of the state and transfer this water through a series of pipelines, tunnels, and canals into the Great Basin in the central part of the state where the majority of the population resides. Currently there are plans to transfer even more water from the Colorado River Basin to the Great Basin.
For what purpose(s) have transfers been allowed		A range of beneficial uses;	Irrigation and municipal.	For all recognized purposes. In the early 1900's most of this water was transferred for agricultural use. As the state has urbanized, this water is increasingly used for municipal and industrial purposes.
How do inter-basin transfers affect priority of use between the two basins	Original priority maintained?	The priority of a right will be fully adjudicated in the point of diversion basin.	At the point of diversions, the prior appropriation doctrine is applied. In the new basin the imported water is not subject to prior appropriation when co-mingled with native waters.	Transferred water retains its original priority date. Water is distributed by priority within a river system. It is the location of the diversion that determines which river system the water is administered under.

STATE:	California	Montana	Wyoming	Utah
Intra-Basin Transfers (Within Major Basins)				
Does the legislation allow water to be transferred from one part of a major basin (sub-basin) to another?	There appears to be no prohibition on intra- region transfers. The State promotes & facilitates water transfers.	Yes.	Yes	Utah statutes allow the place of use of an existing water right to be changed. The law does not prohibit new appropriations from transferring water to other areas.
How is each sub-basin defined? • Hierarchy? • Size? • Between drainage areas? • Cross-border considerations?	See above comments on hydrologic regions.	There are 85 basins. Basins are defined for the purposes of adjudication by the water court. There are four main geographical drainages; the Lower Missouri, the Upper Missouri, the Yellowstone River and the Clark Fork River.	By drainage are or basin.	There are three continental drainage systems in Utah: the Columbia River Drainage, the Colorado River Drainage, and the Great Basin Drainage (which has no outlet to the ocean). There is nothing in the statute that separates these basins from each other. So although they are hydrologically separate, statutorily all water is simply considered to be "waters in the state." There are seven regional offices in the state which administer water rights in a portion of the state. These regions are generally defined by major drainage basins such as the Utah Lake/Jordan River Drainage or the Sevier River Drainage. These regions are further divided into a total of fifty "water right areas" across the state of Utah. The boundaries are generally defined by major hydrologic features such as rivers and topographic divides. There are also several smaller sub-areas such as canyons or other independent flow systems that may be recognized and managed separately. All basins and sub-basins within the state are defined by the State Engineer and not by the legislature.
For what purposes are intra-basin	California has codified as state policy: "to facilitate the voluntary transfer of	Any beneficial purpose	All recognized beneficial uses.	Any recognized beneficial use.

transfers allowed?	water and water rights where consistent with the public welfare of the place of export and the place of import." And declares it to be in the public interest to conserve water by assisting in voluntary transfers to allow more intensive use of developed water resources.			
Are there limits on the volume of water or distance that water can be transferred?	Leases are limited to a term of up to 5 years and not more than 25% of the volume of water that would be typically used or stored by the right holder. Special consideration is given to leases involving water related to the Sacramento-San Joaquin Delta. Special provisions apply to water districts and similar bodies.	Only the limits imposed by the doctrine of beneficial use and any generally applicable limits.	Each permit may contain limiting conditions.	There are no statutory limits on the volume of water or distance that water can be transferred.
What is the process by which intra-basin transfers occur?	Appropriative right amendment as above?	The same process as for any permit and change application with applicable criteria.	The same as for all other water rights.	An Application to Appropriate or Change Application must be filed with the State Engineer. The statute does not distinguish between intra-basin transfer applications and other applications. The same analysis criteria found in U.C. 73-3-8 apply to both.
Is there a requirement to consult the public or other water users?		Yes; as above.	Permits cannot be granted if they are detrimental to the public welfare.	Applications must be advertised in a local paper once a week for two consecutive weeks. Small applications may be exempted from this requirement subject to the discretion of the State Engineer. A hearing may be held at the request of the protesting parties.
What tests are used to determine whether an intra-basin transfer is allowed?		The same rules as for any permit and change application.	The same as for all other water rights.	All applications are evaluated based on the provisions of U.C. 73-3-8, for in-state transfers. This section of the code is summarized earlier in this document as a response to "What factors are considered before an allocation can be issued?"
What conditions are put on approved intra-basin transfers?		The same types of conditions as included in any permit and change application	A multitude of conditions including season and volume.	They are all approved subject to the priority dates of other water rights. Other common conditions are that water use measurements must be

				reported to the state or that compensation must be provided to other water right holders that are impacted.
Have any such approvals been issued? How many?		There are many water rights pre-1973 in Montana that have a point of diversion in one of the 85 recognized basins and a place of use in another basin. For example, a water court temporary preliminary decree in relation to Basin 43Q refers to 23 inter-basin transfer claims out of total of 2,743 claims subject to adjudication in the basin.	Yes – number is small.	Intra-basin transfers are very commonly approved in Utah. These types of projects started in about the late 1800's, not long after the area was first settled by non-natives, and before the creation of appropriation statutes in 1903. Intra-basin transfers have continued up to present times and will continue into the foreseeable future.
For what purpose(s) have intra-basin transfers been allowed		A range of beneficial purposes, such as irrigation, and stock watering	Irrigation and municipal	For all recognized purposes.
How do intra-basin transfers affect priority of use between the two sub-basins		The priority of a right will be fully adjudicated in the point of diversion basin.	At the point of diversion the prior appropriation doctrine is applied. In the new basin, the imported water is not subject to prior appropriation when co-mingled with native waters.	Transferred water retains its original priority date. Water is distributed by priority within a river system. It is the location of the diversion that determines which river system the water is administered under.